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FARMERS DIGEST

CORN GROWER'S ANNUAL ISSUE

Volume 23 Number 10

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IS "ADJUSTING SUPPLY TO DEMAND" A SOLUTION TO THE FARM PROBLEM?

We are frequently told that farmers could get satisfactory incomes if they would only "adjust supply to demand." Is there real scientific backing for this idea?

In the usual sense, supply means the amount that is in existence at a given time and place. Demand refers to a quantity removed from a market under a variety of conditions that includes price.

Any supply can be sold at some price. The higher the price, the less will be demanded, or sold. The lower the price, the more will be demanded. Supply and demand come into equilibrium and the market clears at some price.

Most of those who talk about adjusting supply to demand seem to believe there is a specific rate of production that will insure profitable prices and satisfactory incomes . . . That a small cut in output would force a big rise in prices. But continuous low production is something else again.

Substantial amounts of our big money crops are exported. Even if we were able to force our own consumers to pay more for their food, cotton and tobacco, we cannot force foreign buyers to do so. They have too many other sources of supply.

Farmers would like to sell more higher priced foods — like butter, beef, pork and milk. But all of these foods have lower priced substitutes — margarine for butter, chicken for beef, eggs for pork, etc. If food prices rise materially, consumers will use more economy foods and leave the higher priced ones on the shelves.

For these and other reasons it seems very doubtful that any large share of the income problems of farm families can be solved by restricting production to raise prices of farm products.

L. H. Simerl
Illinois Farmers' Outlook Letter

THE FARMER'S DIGEST

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The Farmer's Digest

Volume 23 April, 1960 Number 10

Low Plant Population Puts A Lid On Corn Yields

When you use fertilizer, don't forget to adjust your planter . . .

Condensed from Midland Cooperator

Craig Hanson

MORE fertilizer, better hybrids and improved management practices have boosted average corn yield 20 bushels per acre.

However, despite all these improvements, plant population per acre has not changed significantly and farmers generally have not had thick enough stands to make full use of fertility and the new management methods.

Many farmers believe that a heavy plant population of 16,000 or more stalks per acre reduces their yield but they have overlooked the fact that the acre yield depends upon the amount of shelled corn rather than the size of the ears. Even those who aim for high yields very frequently do not get them because of what has been believed to be a heavy mortality of seed from planting to harvest.

Research in Ohio strongly indicates the advantage of plant populations ranging from 16,000 to 18,000 plants per acre. In average to good years, this can mean from 20 to 30 bushels more corn per acre compared with plant populations of 10,000 to 12,000 per acre.

In unfavorable growing seasons, the lower plant populations may have a 3- to 5-bushel per acre advantage over high populations but over all, the balance swings heavily in favor of an actual plant count of 16,000 to 18,000 at harvest time.

The high population, however, assumes that a farmer will do a

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Midland Cooperator, 739 Johnson Street, N.E., Minneapolis 13, Minnesota

good job of carrying on the other management practices. These include high soil fertility, a top flight hybrid, improved tillage, drainage, and insect control.

Data shows how important it is to combine a high population with fertility and other good management methods. For example, unfertilized soil that has a capacity to produce only 40 bushels of corn per acre recorded very little increase when extra plants were obtained. But, when fertilizer and manure were added to raise the fertility level, the yield went up to 90 bushels per acre with just a few more stalks per acre.

Four hundred pounds of row fertilizer plus 4 tons of manure were applied on these plots.

These and other data clearly show that maximum efficiency from applied fertilizer cannot be obtained with a poor stand of corn.

A clear indication that corn stands on farms have not been keeping pace with the increased use of fertilizer is shown by stand counts on demonstrations conducted by the agricultural extension personnel during the past five years.

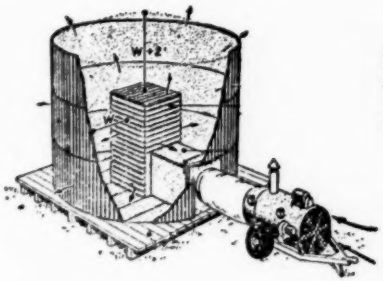
In this period in Ohio an average of 12,700 plants per acre at harvest was recorded in more than 4,000 field stand counts. At planting time, however, the corn planter was set for approximately 19,000 seeds per acre. The average stand for the state is estimated at between 11,000 and 12,000 plants per acre at harvest time.

We have assumed that when corn planters were set for 19,000 seeds dropped per acre, the reduction in stands to about 12,000 stalks was due to the mortality of the seeds and plants. However, checks with corn planters have indicated that with seed plates recommended by seed corn producers, and planting speeds up to 7 miles per hour, the actual seed drop was as low as 65 per cent of the planter setting.

Farmers are just not getting enough seed into the soil. If we expect to get high yields that will make efficient use of the applied fertilizer, planter operation needs to be adjusted so that the intended number of kernels of corn are actually dropped in the seed bed.

Agronomists are interested in good plant population rates in corn. Without adequate plants, fertility soil management practices which we recommend do not have an opportunity to show response. In other words, poor or inadequate stands of corn are responsible for little or no yield response to increased fertilizer applications and good management practices.

Don't Leave Your Wages In The Field



Mechanical drying helps you grow the biggest yield and harvest all of it . . .

Condensed from The Furrow

Ralph Hughes

WITH thousands of dollars wrapped up in land, livestock, buildings, and equipment, successful farmers are going all out—each in his own way—to eliminate many of the risks in farming.

They irrigate to provide ample moisture and fertilize to boost yields. They use hay conditioners to speed curing and bale ejectors to put crops away before sundown. And when field drying is uncertain, many farmers dry their corn and small grain mechanically to garner a maximum harvest. In other words, the modern farmer is determined to have more than luck on his side when he's gambling with the weather.

Take Grain Drying

The dollars-and-cents return from mechanical drying comes mainly from: 1. Increasing the amount of grain you have to sell or feed by reducing harvesting and storage losses; and, 2. getting a better price for the grain you sell either by more timely marketing or by raising the market grade of the grain, or both.

In corn, field losses from lodging and dropped ears increase as the crop dries. And field losses with harvesting equipment increase as the moisture content goes down. Mechanical drying reduces these losses by making earlier harvesting (at higher moisture levels) practical. Earlier harvesting sometimes gains a price advantage by getting corn to market before the normal price decline.

What Farmers Say

Each farmer usually has his own reasons why he believes grain drying saves—or earns—money. John Wernimont of Auburn, Iowa, for example, bought his dryer with the government's control program in mind. Werni-

Reprinted by permission from The Furrow, Moline, Illinois

mont remarked, "In order to comply with federal regulations, we have to dry our milo and corn to a moisture content safe for storage."

Art Lauritsen of Exira, Iowa, wanted to make his cattle-feeding operation more efficient, so he bought a grain dryer. Art explains his changes this way, "Now that I've switched from ear corn to shelled corn, I have twice the storage space. I can dry and store my own corn, then use rest of space to store shelled corn that I buy and dry at harvest time. The saving I make in the fall over buying corn in the summertime will help pay for the dryer."

40c Bushel Bonus

Emil Heck and his son of Douglas county, Kansas, dried 10,000 bushels of corn last year to a moisture content safe for storing under government loan. This average drying cost was 3-½c per bushel, including cost of propane for dryer, gasoline for tractor, and $15 a day for operator. The local elevator's price for No. 2 yellow corn was 95c on October 2, or 82c for corn delivered with 22 per cent moisture content. Government loan value of compliance corn was estimated at $1.35. So the Hecks had a big reason—dollars-and-cents-wise — to dry their own corn.

Heck's milo had a moisture content of 14-½ per cent at harvest. Since the price discount was quite low, Heck said they couldn't afford to dry it. "But," he added, "another year the situation is likely to be different and now we're all set to dry wet milo and avoid a big dockage."

Grain drying is a definite part of farm management. Not just in the Corn Belt, but wherever farmers have to gamble with the weather at harvest time, grain drying is taking some of the risk out of farming.

Corn Likes Music (?)

Out of the mysterious East has come a new way of making cornstalks grow faster. According to a report from India, delivered at the Ninth International Botanical Congress in Montreal, the same flute music which Indian snake charmers play to their cobras has made cornstalks grow faster than plants left in silence. The report said that flute music was played to a selected group of plants half an hour each day for 30 days. Another group was left in silence. The plants which listened to the music grew 25 to 50 per cent faster.

Could be they didn't like the tune!

—Health News Farm Facts

Plant Corn Solid For Green Feed?

You may get better land utilization and more feed with this planting method . . .

Condensed from Farm Journal

HERE'S a new idea: Plant corn *in a solid stand* with your grain drill—300,000 to 400,000 stalks per acre— then harvest it six to eight weeks later for green feed or silage.

What do you get? About 30 tons of green feed per acre in Illinois, reports William Reid, researcher with Pfister Associated Growers, Aurora, Ill.

But that's only part of the story: Those 30 tons of chopped stalks actually contain almost 9,000 lbs. of total digestible nutrients—*about as much "feed" as there is in 200 bushels of No. 2 shelled corn or nine tons of alfalfa hay!*

This ability of corn to make quick, quality feed—*almost a ton per acre per day during the first six weeks*—has both scientists and farmers excited. Dairymen, for instance, who like to have green feed to supplement their pastures during summer drouths.

In Barnes County, N.D., LaVerne Homan put on 80 lbs. of 16-20-0, then on June 22 planted 3½ bushels of hybrid corn per acre—mostly butts and tips. He used his grain drill; ended up with almost 300,000 stalks.

Despite drouth, Homan's thick-planted corn (never cultivated) came through with 16 tons of silage per acre. He used a forage harvester with a reel and cutter bar head to chop in the field.

Homan's corn in 42-inch rows, fertilized the same, averaged only 5 to 7 tons of silage. But it tested 3.7% protein; the drill-sown, only 2.8%.

However, he believes he can boost protein by using 150 lbs. of 19-19-0 per acre, and he plans to put in two thick-planted fields in 1960—25 acres in mid-May, another 25 acres in mid-June. He'll feed the silage to his 100-cow herd. "They eat it better than regular silage," says Homan.

Careful pruning is an important practice for fruit growers.

Researcher Reid, reporting at the Hybrid Corn Industry Conference in Chicago, also told

Reprinted by permission from Farm Journal, Philadelphia 5, Pennsylvania

about an Illinois farmer who thick-planted in April and turned under a 40-ton crop of green manure in June. He then replanted and grew another 40-ton crop for silage.

In Hampden County, Mass., 180,000 plants of a dwarf hybrid made 28 tons of silage per acre for Dave Matthews, corn breeder for Eastern States Farmers' Exchange.

With 300,000 or more plants per acre, the stalks are small and can't take summer windstorms. So letting the corn get more than chest-high is risky.

Researcher Reid speculates that drill-sown corn might be suitable for pelleting. You could wilt it in the field—like alfalfa. And by timing your plantings, you could space the harvests to fit a pelleting schedule.

Corn Smut Tends To Vary With "Crop Sequence"

The amount of tassel smut disease in corn seems to vary according to what crop was raised in the field the year before.

University of Minnesota plant pathologists Roy D. Wilcoxson and R. P. Covey found that true in three years of trials. Heaviest smut (13-14 percent of the plants) was in fields which had raised oats, soybeans or flax the previous year.

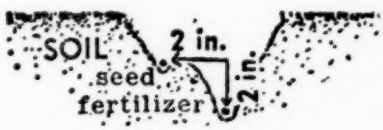
In corn following corn or wheat, though, only 8 percent of the plants had smut. The result did vary a little from one year to the next. The difference between the various crops was most marked in 1956 and '57, but the trend was still there in 1958.

For example, 7-9 percent of the corn following corn or wheat was smutted in 1956, compared to 11 percent of that following soybeans, 12 percent following oats and 18 percent following flax.

The next year, percentage of smut was 12 percent following both corn and wheat and 19-21 percent for the other crops. In 1958, the figures were 3-5 percent following corn and wheat and 5-7 percent for corn after soybeans, oats and flax.

Smut is a common disease of corn in the U. S. It can be controlled with resistant hybrids, and up to now, little attention has been given to control by other means. The Minnesota tests give the first experimental evidence that crops other than corn might increase incidence of smut. *—University of Minnesota*

The Right Place For Starter Fertilizer



"Two plus two" equals correct placement . . .

Condensed from
The Dakota Farmer

CORN will receive the most benefit from starter fertilizer when it is placed two inches below and two inches to one side of the seed.

When fertilizer is placed in a band off to one side and beneath the seed it will be directly in the path of growing roots. It will be available when needed the most. This gives the corn the phosphorus it needs for a fast start.

Poor placement may hinder growth. The old split boot attachment for the corn planter was set to place the starter fertilizer on both sides of the row and above the seed. When the roots grow down, they miss most of the benefit of the fertilizer. Rains may cause some fertilizer to move down, but much of it still remains too high to do the roots any good.

In some cases the fertilizer is placed in direct contact with the seed. The modern split boot spills a part of the fertilizer directly onto the seed. When the fertilizer gathers moisture, it makes a concentrated salt solution. This solution not only injures germination; it may completely prevent it. This is most likely to happen when heavy applications are used and there is no rain during the first days after planting.

When the modern adjustable single boot fertilizer attachment places the fertilizer on one side and below the seed, there is no chance for it to injure the seed or young sprout. When the roots reach the band of fertilizer, it accelerates their growth at a time when they can make good use of the nutrients. This results in better weed control, less covering of the corn plants, and a better stand.

When fertilizer is placed above the seed, it s t i m u l a t e s weed growth and makes weed control a more difficult job. Deeper fertilizer placement gives the weeds less chance to benefit from it.

When fertilizer contains an insecticide, it should be applied according to the manufacturer's recommendations. Best results are often obtained by applying fertilizers and insecticides separately.

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Soil Testing; A Real Private Eye

"Without testing, you may be wasting your fertilizer money" . . .

Condensed from
Better Crops With Plant Food

OSCAR Ruprecht of Eden Valley, Minnesota, says soil testing is a real "private eye" for solving the mysteries of low corn yields.

A soil test this year so precisely named the "culprit"—low potash—in one of his fields that dairy farmer Ruprecht found he could raise his corn yields by 50 percent or more through use of this one fertilizer nutrient.

He made the finding through some on-the-farm "experimenting" with help from Howard Grant, Meeker county agent; Lowell Hanson, University of Minnesota extension soils specialist and John Grava, supervisor of the University soil testing laboratory.

Here was the situation: When Ruprecht came to the farm four years ago, he felt he was lucky to get 30 bushels of corn per acre. Since then, he's been using 150-200 pounds of 5-20-20 per acre, and raised yields to 50 bushels per acre. But he still wasn't satisfied. So this spring, he sent a soil sample to the University for testing.

"The test showed an alarmingly low potash level", he recalls. "It was so low, that it showed the field needed 80 or more pounds of this nutrient per acre alone. Phosphorus, on the other hand, wasn't especially short, the test showed." If this were accurate, Ruprecht knew it meant that 5-20-20—which contains 5 pounds nitrogen, 20 pounds phosphate and 20 pounds potash in each 100 pounds—wasn't the right mixture. It would contain too much phosphate and not enough potash.

Ruprecht and Grant both figured some more checking was needed. So they got Hanson's help in setting up a trial to see if the soil test was really telling the truth. They compared three dif-

Reprinted by permission from
Better Crops With Plant Food, 1102 16th Street, North West, Washington 6, D. C.

ferent rates of phosphate, with as many rates of potash.

These were the results: Plots getting no potash yielded only 43 bushels per acre, even when 100 pounds of nitrogen and the same amount of phosphate was applied. But where Ruprecht applied 80 pounds of potash, yields were nearly 70 bushels per acre —regardless of whether any phosphate was applied or not.

A potash rate of 160 pounds per acre raised yields to 82 bushels per acre, but the increase wasn't enough to make such a high fertilizing rate pay.

Ruprecht's conclusion is clear. "There's no longer any doubt that the soil test was right all along," he says. "All summer, you could see that the corn that didn't get any potash was way behind the rest. And the ears from the no-potash plot are small and nubby."

As a result, Ruprecht is sold on soil testing as a way to gauge soil needs. "Without testing, you may be wasting your fertilizer money," he explains.

Test High-Moisture Corn For Growing-Finishing Pigs

High-moisture corn was no better than dry corn fed to pigs in an experiment at the University of Illinois.

D. E. Becker, swine researcher at the University of Illinois, Agricultural Experiment Station, says this study was made to find the nutritive value of high-moisture corn stored in experimental wooden-stave silos.

In this study 32 crossbred pigs weighing about 80 pounds at the start were fed in one-fourth-acre alfalfa plots for 49 days.

Gains averaged 1.44 pounds a day with the pigs fed corn harvested and ensiled in a wooden silo at 27 percent moisture, 1.37 pounds a day on corn harvested at 27 percent moisture and ensiled in a wooden silo at 40 percent moisture after water was added, 1.35 pounds a day on corn harvested at 13.5 percent and ensiled in a wooden silo at 40 percent moisture after water was added and 1.41 pounds a day on corn harvested at 13.5 percent moisture and stored in a bin.

Some moldy corn was found at the top and sides of the ensiled corn, Becker says, but feeding it did not seem to have any effect on the pigs in this test. —*University of Illinois*

How To Make Good Corn Silage

Corn silage makes an economical feed for dairy cows when properly ensiled and fed. Even though corn is an ideal crop for making silage, too many farmers feed silage that would grade fair or poor because of careless ensiling.

The silo must be airtight with well-fitted doors. Air leaks cause spoilage and mold growth. Field choppers should be checked and cutter knives sharpened because well-chopped silage compacts better and distributes more uniformly than poorly-chopped silage containing a lot of unchopped leaves and husks.

Silage corn should be harvested when about one-quarter of the kernels have begun to den (early dent stage). Do not wait until stalks and leaves begin to dry, if this happens before kernels dent, it would be wise to fill at once. If, because of a wet season, the standing corn appears excessively high in moisture when it reaches the early dent stage, ensiling might be delayed to prevent excessive seepage. This may be necessary if the corn is frosted or drought stricken. When the leaves dry before filling special precautions are necessary such as: use ¼" theoretical cut and be sure cutter blades are kept sharp, use distributor pipes lowered to near the fill to prevent leaves blowing to the outside, and add water while filling. If possible, put green corn on top. Even with these precautions some feed value will be lost.

It is not wise to attempt to get both crib corn and corn silage from the same corn field. Removing the ears removes feed value from the silage and means that extra grain would have to be fed with this silage. Leaving all of the ears on the silage corn is essential for making good corn silage with a lot of energy for dairy cows.

Good corn silage rates high as a palatable nutritious feed. When fed in proper combination with good legume roughages, it holds a high place as a feed for dairy cows. Corn silage made from well-eared corn and ensiled at the right time is among the highest yielding crops in terms of energy or T.D.N. per acre.

Be aware of the possibility of toxic gas production when corn silage is made. The presence of nitrogen dioxide is detected by a bleach-like odor and, in higher concentrations, brown heavy fumes. This usually occurs within 24 hours of filling. Take precautions of running blower before entering silo and also, thoroughly ventilating silo rooms and adjacent areas. Avoid inhalation of these fumes — this gas is deadly.

—University of Wisconsin Dairy Husbandry Department

Good Silage Starts With High-Quality Crops

To get top feeding value, nothing can be left to chance. Here's what the experts say . . .

Condensed from The Ohio Farmer

Austin Showman

IF YOU'RE really interested in producing silage, you will plan it as a part of your farming operation.

You will plant certain crops with the intention of putting them in the silo. Then you will harvest these crops at the proper time. Your pay will come in the form of extra pounds of milk and meat.

Speakers at a recent silage conference on the Ohio State University campus emphasized these things in presenting a story of silage from field to feed bunk.

The crop you plant for silage, said Extension Agronomist George Gist, will depend on several things: The type of feed you want; land factors such as slope, drainage, and your crop rotation; work loads and availability of machinery; your personal likes and dislikes and the productivity of various silage crops.

There's a lot of interest in grass silages these days, but corn still is king of the silage crops, Gist said. One thing frequently overlooked, according to Gist, is that the proper stage of ensiling grain accounts for more than 40 per cent of the weight of the corn plant. Practices which increase vegetative growth but interfere with ear development usually reduce total production of the corn crop. Sorghum drilled with corn may mean large vegetative growth per acre, but often it is accompanied by a decrease in corn grain production.

Dr. Gist and other speakers pointed out that quality silages start with quality crops. Dr. T. A. Meyer, managing director of the National Silo Association, said: "As a feed, silage can be no better than the crop from which it

Reprinted by permission from The Ohio Farmer, 1010 Rockwell Avenue, Cleveland 14, Ohio

is made. To make quality silage, start with quality crops. Too many livestockmen refer to the forage crop in terms of tons per acre with little regard for the nutritive value."

Feeding value per acre, Meyer said, depends on pounds of digestible nutrients, not on tons of harvested crops.

An Ohio Agricultural Experiment Station economist, Dr. E. T. Shaudys, explained still further this business of total digestible nutrients in terms of dollars and cents.

"On a total digestible nutrient basis," Shaudys explained, "the cost of grass-legume silage is higher than hay, and corn silage is higher than corn for grain." He presented figures as evidence:

Crop	Cost Per Ton	Per Cent TDN'S	TDN'S Per Acre	Cost Per 100 Lbs. TDN
Hay, first crop	$13.82	50	1700	$1.38
Grass-legume silage	5.47	18	2160	1.52
Corn grain	21.14	80	4480	1.32
Corn silage	6.95	20	5200	1.74

Don't be fooled into thinking that you can improve the nutrient value of a crop by putting it in the silo. It won't help a bit, said Dr. William J. Tyznik, animal scientist of the university and experiment station. "One of the primary advantages of ensiling a crop," he said, "is to make it possible to harvest forages at a stage of higher quality. If we do not get this accomplished we are defeating the purpose of the silo."

Tyznik pointed out that silage won't cure all your problems of forage preservation. In fact, it may present some new ones. Even good silage, he said, cannot be expected to provide all the requirements of animals geared for top production. He urged more emphasis on using silage as a feed—appreciating its shortcomings—and less emphasis on using it as a stop-gap operation.

Animal scientists of the extension service and the experiment station discussed latest information on feeding silage to beef cattle, dairy cattle, sheep and swine. Following are brief summaries of their reports:

Dairy Cattle

(C. D. McGrew, Extension dairy specialist)

The rate and extent of silage use on dairy farms is increasing slowly each year. The percentage of silage from meadow crops increased rapidly from 1945 to about 1956. In the last three years corn silage use has increased more than meadow crops. To

some extent, large diameter (18 feet or more) vertical silos are replacing horizontal silos for large tonnages. Rate of silage feeding to dairy cows has more than doubled in the last 10 years. The rate now is about 2.8 tons per cow per year. Dairymen from the Northern Great Lakes states, the New England, and Middle Atlantic states practice heavier silage feeding. The U. S. average is 2.5 tons per dairy cow annually.

Beef Cattle

(Earle W. Klosterman, animal science department, The Agricultural Experiment Station)

Hay-crop silages are excellent for wintering a cow herd and, if fed with ample grain, they can well be used for fattening cattle. However, mature beef cows can utilize large amounts of relatively poor roughages. Hay-crop silage has been only slightly better than good quality hay for fattening cattle. In a beef cattle operation, returns from a silo are likely to be greater when it is filled with corn than with meadow crops.

Experiments in Ohio and elsewhere have shown that well-eared corn silage is hard to beat in pounds of beef produced for acre of cropland fed. Returns likely will be greatest when some grain is fed with a liberal amount of corn silage. When fed in this manner, Ohio experiments indicate that, on a dry basis, corn silage supplies as much energy as ground ear corn.

Sheep and Lambs

(George R. Johnson, chairman, department of animal science, The Ohio State University)

Most research results would suggest that at least one pound of good legume or mixed hay should be fed with corn silage to make the best use of the corn silage for wintering breeding ewes. Corn silage as the only roughage for pregnant ewes has been satisfactory if properly supplemented with a protein supplement and a calcium supplement. Results of hay-crop silage for breeding ewes have been inconsistent.

In the case of lambs, most work would suggest that at least one-half pound of good legume hay be fed per lamb per day when feeding corn silage as the major roughage. Feeding corn silage usually reduces feed costs. Seven trials conducted by the Ohio Agricultural Experiment Station show that legume-grass silage is a valuable addition to legume hay in the ration for fattening lambs. This work suggests that about one-half pound of hay

Best control of corn leaf blight is crop rotation and the use of resistant varieties.

should be fed daily when legume-grass silage is used as the major roughage.

Sows and Gilts in Gestation

(H. M. Barnes, Extension Swine specialist)

Two factors make the bred sow or gilt a little "extra hungry." They are the needs of the developing fetus and the restricted energy allowance that prevents overfatness. This suggests the bred sow or gilt will accept more fiber and less attractive ingredients than full-fed market hogs will consume. The quality of the silage and the voluntary consumption of silage by brood sows may vary widely.

Use of silage suggests these fundamentals be considered in method of feeding: A greater volume of feed daily; careful attention to the formulation and allowance of supplement; hand feeding the supplement; hand feeding energy feeds in addition to the supplement and silage; and careful appraisal of quality of each silage crop. Supplemental needs may vary from season to season.

Corn Resistant To Borer

New discoveries about a plant's built-in resistance to the European corn borer are speeding development of corn able to shrug off this traditional enemy.

In 1956 scientists first isolated a chemical which—when present in plant tissue—helps corn kill off the young borers. Researchers call it Resistance Factor A (RFA). Since then University of Wisconsin scientists S. D. Beck and E. E. Smissman have continued studying the chemical. One of their recent findings is especially important. It might point the way to development of hybrids actually resistant to the borer.

While checking RFA levels in corn plantings of a somewhat resistant inbred line, the researchers found that certain plants had much more RFA than others. This indicates that even though the line is apparently "pure" its borer resistance can be improved.

This discovery is a major one from a plant breeding standpoint. It means that selecting plants with high levels of RFA could lead to foundation stock for resistant hybrids.

The researchers point out that such selection could be accomplished by chemical tests for RFA levels in each plant. Any plants showing a high RFA test could be saved for breeding stock.

—University of Wisconsin

Hull-Less Oats — Pros and Cons

Oats from the Orient produce favorable yields on a groat basis, and they make good feed for poultry . . .

Condensed from Maine Farm Research

Clinton R. Blackmon, Agronomist

HULL-LESS oats were introduced to America from the Orient where they have been grown since the fifth century or earlier.

These oats proved of value in remote areas of the United States and Canada where grinding mills were not accessible. They could be fed to young stock and poultry without being ground.

Feeding tests conducted by Dr. R. W. Gerry at the Maine Agricultural Experiment Station proved the superiority of hull-less oats over common oats as a poultry feed. Since we now have machines for dehulling oats at moderate costs, it becomes necessary to produce the hull-less variety on a comparable cost basis. The ordinary oats have about 30-35 per cent of their weight in hulls. These hulls are of little value as a poultry or swine food. If we should convert common oats to groats, or hull-free oats, we would get only about 70 bushels of hull-free oats out of every 100 bushes.

Over a three year period 1955-57, the average yields in tests at the Maine Agricultural Experiment Station were as follows:

Variety	Yield bu./A. 32 lb. bu.	Converted to groats
Clinton "59" (common oats)	55.9	39.1
Garry (common oats)	69.6	48.7
James (hull-less oats)	41.2	41.2

Hull-less oats produce favorable yields when compared with common oats on a groat basis. When other varieties of common oats and hull-less oats are compared some advantages in yield remain with the common varieties.

Reprinted from Maine Farm Research, Maine Agricultural Experiment Station, Orono Maine

Diseases generally have not been a problem with hull-less oats in most states perhaps because of their early seeding and early maturity.

Some varieties of hull-less oats are stiffer strawed than some varieties, but they have other adverse characteristics such as less disease resistance.

In combine-harvesting of hull-less oats some seed is lost since the seeds in the top spikelets of the panicle are very small and do not thresh easily. Storage is a problem since hull-less oats must be drier than ordinary oats for safe storage.

There is a good potential for hull-less oats, but much work must be done to breed a stiffer straw. We are working on this problem at the present time.

Grinding, Mixing Feeds On Farms Saves Money

Feed costs can be cut considerably when farmers grind and mix their own concentrates.

Kenneth Loope, agricultural economist at Virginia Polytechnic Institute, has analyzed the costs and savings on a typical poultry farm with 5,000 layers to stress the advisability of "doing it yourself." And he's come up with a whopping estimate of $7,500 which a poultryman could save by grinding and mixing his own feed for a year for 5,000 birds.

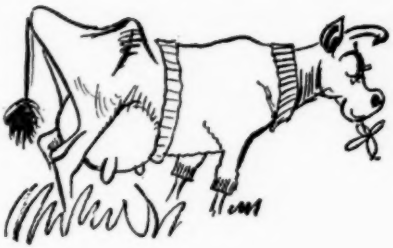
Poultry specialists say that in winter a 15 percent protein ration of corn and 40 percent poultry supplement will meet all known nutritional needs. In summer a 16 or 17 percent protein should be fed. To mix 250 tons of concentrate feed—the amount needed in a year by 5,000 layers—will cost $56.91 per ton, assuming corn at $1.30 a bushel and 40 percent poultry supplement at $4.60 per cwt., and assuming certain other conditions. The present price for a 15 percent poultry ration is around $88. The difference—$31.09 per ton, or around $7,500 for the 250 tons needed annually.

Loope says that to make this saving, farmers may find it necessary to dry and store corn on the farm to be sure they have top quality ingredients for the mixed feed.

A completely automatic grinding and mixing system can be bought for $1,500 or less. This includes gravity bins, grain elevators, and automatic mill with attachments.

—Virginia Polytechnic Institute

Why Cows Leave Home



Evaluation of long-time Beltsville records shows little to gain from deliberate selection for long life . .

Condensed from
Agricultural Research

AT what age does a cow leave home?

As a rule, at about 6 years when she stops producing or breeding, unless she dies first of disease, infection, broken bones, or from eating a few too many nuts and bolts.

Would it be profitable to concentrate on efforts to lengthen a cow's life? Some think it may have possibilities for improving the herd. A longer life would theoretically mean more calves and more milk.

But a study of 40-year herd records at USDA's Agricultural Research Center, Beltsville, Md., shows that *automatic* selection for long life—incidental to selection for high production and other qualities—is already so intense that it would be practically impossible to exceed it by deliberate effort. Moreover, the heritability of long life appears to be so low that the effectiveness of deliberate selection for this trait is questionable anyway.

Longevity Influences Studied

The evaluations were made by ARS dairy husbandman J. B. Parker and associates to determine environmental and genetic influences on long life in nearly 1,000 Holstein and Jersey cattle. None of the herds had ever been culled for low production or poor type during the 40 years.

Reasons for disposing of cows are important in judging overall herd longevity. Evaluation of the Beltsville herd disposal records showed cows were removed for various diseases, infections, and udder troubles. A large number, however, were removed as nonbreeders—41 percent of the Holsteins and 24 percent of the Jerseys. This indicates the importance of nonbreeding as an influence on life expectancy.

Reprinted from Agricultural Research, Agricultural Research Service, United States Department of Agriculture, Washington 25, D.C.

The large percentage of non-breeders removed may have resulted because more detailed disposal records are kept in the Beltsville herds than are made in most Dairy Herd Improvement Association herds. The Beltsville data may reflect more accurately the importance of poor reproduction as an influence on longevity than DHIA information.

High Producers Tend to Last

A positive relationship—low but significant—was found between long life and first-lactation production in both Holstein and Jersey herds. This suggests that cows that are high producers in their first lactation don't "burn-out" or stay in the herd for a shorter time than other cows. In fact, the data indicate that the higher producers tend to stay in the herd longer than low producers even when no selection is practiced for production. This finding should be of special significance to sire-selection committees when they evaluate progeny tests that are based primarily on first-lactation records.

These evaluations don't detract from the importance of bringing about longer life through improved management, say the scientists. Disease and injury prevention practices and proper feeding and management *can* bring longer life and improve efficiency of herd operations.

TABLE 1. REASONS FOR REMOVAL

HOLSTEINS	
Non-breeders	41%
Udder troubles	11%
TB Reactors	15%
Died	10%
Infections	8%
Bang's Reactors	3%
Others	12%
JERSEYS	
Non-breeders	24%
Udder troubles	10%
TB Reactors	15%
Died	5%
Infections	7%
Bang's Reactors	22%
Others	17%

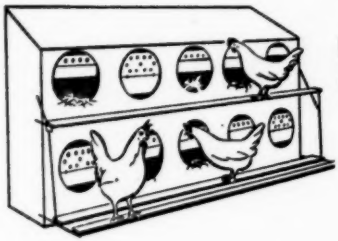
Meat From Boar Hogs

Meat scientists at Michigan State University are pinning down the location of sex odor commonly associated with meat from boar hogs. According to Dr. A. M. Pearson, the sex odor is concentrated in the fatty tissue of the body.

Work is underway in which attempts will be made to identify the compounds responsible for the sex odor. "If they can be identified," believes the scientist, "it may be possible to circumvent the odor and flavor in pork products by means of chemical treatment."

—Michigan State University

How To Get Better Poultry Feed Efficiency



Use these factors to produce a dozen eggs with less than four pounds of feed.

Condensed from Poultry Tribune

Steven C. King

THERE'S nothing like the low egg prices we had in 1959 to make you stop and ponder — what makes feed efficiency for laying hens?

The commonly used expression "pounds of feed per dozen eggs" hides a multitude of important factors that can keep you from reaching that elusive goal of less than 4 pounds of feed per dozen eggs.

With egg farms becoming highly automated, many of the various costs of producing a dozen eggs have come down. Still a very large item in the cost column is the 4 to 6 pounds or more of feed that a hen requires in order to shell out a dozen eggs. Egg producers aren't likely to see the high margins of a few years ago again, so it's time to see what can be done to get that feed - consumption - per - dozen-eggs - produced down as low as possible.

For our purposes, it will be convenient to divide the factors contributing to feed efficiency into two sources—genetic factors and non-genetic factors. There is a good deal of interrelationship between these two major sources of influence.

Genetic Factors

1. Body weight—feed required for maintenance.

2. Body weight—feed required for gain in weight.

3. Number of eggs produced—feed needed for an egg of average size.

4. Egg weight—feed nutrients required vary with size of eggs produced.

5. Sexual maturity—more feed needed for maintenance of late maturing birds.

6. Relative activity of hens—how much feed goes into nervous energy?

Reprinted by permission from Poultry Tribune, Mount Morris, Illinois

7. Mortality rate—sick, morbid hens may not eat much, but it adds up!

8. Heritable differences in metabolic rate.

9. Heritable differences in feed utilization or how many nutrients get past the intestinal wall.

Non-Genetic Factors

1. Nutritional makeup of the feed—energy level and protein, vitamin, and mineral value.

2. Feed wastage—how much mash is in the litter?

3. Environment—do the pullets have to eat extra feed because of a cold house?

4. Management—are you feeding so as to build up excess body fat?

5. Environmental or management factors that affect body weight, egg numbers, egg size, sexual maturity, and other genetic factors.

Perhaps you can think of some factors that I have neglected to mention. At any rate, it is obvious that "pounds of feed per dozen eggs" is not so simple. It's made up of a lot of things. In order to find out which factors are the most likely ones to look into for possible improvement in feed efficiency, let's take a look at their relative importance.

Probably the best source of data for such an analysis is the random sample laying tests. A wide, representative sample of the popular strains are tested under a variety of conditions. I reported on such an analysis at the annual meeting of Poultry Science a few years ago. Given that other factors remain constant it was shown that each 10 eggs increase in annual egg production takes about 1.27 lbs. of additional feed. A tenth of a pound higher body weight took .85 lb. of additional feed and one ounce per dozen higher egg weight took 1.48 lb. of additional feed.

At first it may seem that egg weight plays an important role in feed consumed, but when each of these three traits are put in terms of the amount of variation we usually expect for each trait, *number of eggs becomes the most important factor in determining feed per dozen eggs produced.* Body weight follows close behind egg numbers in importance.

Transportation costs amount to about 12 per cent of the total marketing bill for food commodities.

It is difficult to reduce the feed required per dozen eggs below 4 lbs. unless egg numbers are increased and body weight decreased simultaneously. Breeders have learned that accomplishing this goal is difficult because egg numbers, body weight, and egg size

are genetically related in such a way that achieving the desired goal in one trait may result in changing another trait in the wrong direction.

Results from random sample tests indicate that the various strains gain from .95 to 1.50 lbs. in body weight while in the laying house. So far, we have been able to show only small differences in total feed consumption that can be attributed to differences in weight gain.

Unfortunately, we know even less about the relative role played by the list of other factors which I mentioned in the list of genetic factors. However, it is quite reasonable to suppose that each of these play some small role in feed efficiency. None of them can be large for our results have shown that some 80 to 95 percent of the variation in feed consumption in random sample tests can be attributed to differences in egg numbers, body weight, and egg weight.

Corn may be seriously damaged or killed when too much fertilizer is placed too near the germinating seed.

Management Influences Efficiency

The energy content of the feed can have a tremendous effect on feed efficiency. This has been so amply demonstrated by nutritionists that we don't need to dwell on it longer, except to point out that the greater efficiency of high energy feeds should be considered in terms of feed cost per dozen eggs.

How much feed do you find in the litter? Often, the feed wasted by careless filling of hoppers, overfilling hoppers, and billing out by the birds is the place where the greatest gains in feed efficiency can be made. Proper hopper design and careful regulation of the feeding, whether by hand or mechanical, can mean real savings.

Many other environmental or management factors can influence feed efficiency. Certainly, anything that you do that reduces egg numbers will increase the feed required per dozen eggs.

Get Reasonable Goals

Arriving at sensible feed efficincy goals requires more than setting one simple figure like the 5.1 lb. average of random sample tests. This may be a good annual goal to strive to beat, but in order to do this, feed required per dozen eggs is going to have to be less than 5.1 lbs. at least half the year, because it's likely to be above average during the first month or two after housing and again during the last three or four months. This fact must be faced. The birds have reached

their maximum weight and egg size and production is gradually declining during the tail end of the production year. In order to reach a 4.5 average, you will need to hit 4.0 or near that during the peak production in order to counteract the period of 5.0 or greater feed requirement that surely will come later on.

Keep Feed and Egg Records

A continuous record of feed fed and eggs produced should be maintained. Spot checking one week each month might be set as a minimum. Count the eggs collected and keep track of the number of sacks of feed fed or the number of tons fed from a bulk bin. Either let the bin run empty periodically or fill it to the previous level and determine how much feed has been used. Only by constant checking can you discover when your feed efficiency is getting too high. Whenever it gets out of line, start checking for possible causes.

Remember that in spite of good management and environment, you can't hit good feed efficiency levels with a large bird unless you can reach 80 to 90 percent production for extended periods of time. Under present day conditions, you must keep under 5.0 and be striving for 4.0 lbs. of feed per dozen in order to survive long enough to see the better times we hope to see.

Fence Posts Last Longer When Treated

Fence posts are sure to last 15-20 years after treatment with pentachlorophenol, according to a forest products expert at Michigan State University. Eldon A. Behr advises treating any fence posts that have sap wood. The dark-colored heart wood of some species rots slowly or not at all.

"Penta or creosote does the job," Behr points out. "Most species stand the treatment. But two—aspen and cottonwood—resist it."

The scientist advises a three-step treatment:

1. Remove all bark.
2. Let the posts dry out completely before treating.
3. Immerse them full length in the preservative for 24-48 hours.

Behr says several species resist decay. These include northern white cedar, black locust, mulberry, white oak and catalpa.

"Even these species need treatment if sap wood remains on the trimmed post," the scientist warns. "Most small posts do have sap wood."

Lumber yard posts are usually ready-treated.

—Michigan State University

Will You Plant Oriented Corn?

Seed can be placed so plants grow uniformly crosswise of row and shade the ground for better moisture and weed control . . .

Condensed from Nebraska Farmer

PLANTING corn kernels by a method called orientation planting looks good as a means of decreasing soil moisture loss from evaporation.

Here's how orientation planting works: kernels are placed with points down and flat sides running with row. Corn's natural growth pattern brings leaves out almost at right angles to the flat sides of the kernel, and subsequent pairs of leaves emerge slightly counter-clockwise to the previous pair.

Thus, leaves of plants from oriented seed grow into the space between rows in such a way that up to 90% less sunlight strikes the ground. This reduces evaporation. And since each plant produces leaves at about the same angle, there's less chance of a plant shading leaves of its neighbors. Maximum sunlight falls on leaf surfaces.

Random-planted kernels, on the other hand, produce leaves at many different angles to the row. Plants overlap, and they give the ground less moisture-conserving shade.

ARS soil scientist D. B. Peters and plant physiologist J. T. Woolley, in cooperation with the Illinois Agricultural Experiment Station, report that this system of planting results in additional water for plant use, especially during the critical ear-setting period. Experimental plots on which kernels were oriented out-yielded plots with unoriented controls by 3 to 23 bushels per acre.

Oriented Corn Yields More

In limited tests during the 1958 season, unoriented seed check-planted in hills 40 inches apart yielded 98 bushels per acre. Corn planted in staggered hills 40 inches apart produced 104 bushels per acre.

Oriented kernels spaced 10 inches apart in rows 40 inches apart produced 107 bushels per acre. Cutting the distance between rows of oriented seed to 30 inches boosted yield to 121 bushels. Earlier research has shown that checked corn generally yields

Reprinted by permission from Nebraska Farmer, 1420 P Street, Lincoln 1, Nebraska

more than drilled corn.

Slightly better weed control was observed in plots grown with oriented seed because less sunlight penetrated the corn leaf cover.

Plots used in the experiment were small—26.5 feet by 26.5 feet. A heavy application of commercial fertilizer was made in 1956, and 6 tons of barnyard manure per acre were applied in the fall of 1957. Seed of the hybrid U.S. 13 was planted by hand on Sidell silt loam soil.

Scientists believe that the difficulties in mechanical planting of oriented seed corn can be overcome by fastening the kernels to a continuous tape and planting the tape, or through the adaptation of existing commercial planters so they will position the kernels properly in the row.

Results of tests are encouraging but not conclusive, the scientists point out. Plans for other tests include repeating tests on larger areas, plus the addition of unoriented drilled corn as another check. Other work planned includes planting corn in rows parallel to and at right angles to prevailing winds in order to check the effects on yield.

Red Clover Seeding In 18-Inch Rows Looks Promising

Red clover seed producers may some day get higher quality seed by planting the crop in rows 18 or 20 inches apart.

First, though, there would need to be special equipment available for handling clover this way, a University of Minnesota agronomist said recently at the American Society of Agronomy meetings.

Laddie J. Elling reported that planting in rows can produce clover seed yields practically as high as broadcasting. Besides, row-seeding requires less seed at planting time and makes it possible to cultivate the crop. This can result in higher seed quality, through keeping out weeds and unwanted crops.

Elling said that, over a three year period, he found little difference in yields between broadcasting 4 pounds of red clover seed per acre and seeding 2 pounds per acre in 18-inch rows. In 1959, for example, row seeding was just 9 pounds per acre under broadcasting.

However, planting 4 pounds per acre in rows and spacing the rows 36 inches apart both decreased yields.

—University of Minnesota

Repeat Breeder Sows Are Expensive

Can you afford a "hard to settle" sow. Here are ideas for solving the problem of repeat breeders . . .

Condensed from National Hog Farmer

H. L. Self, Iowa State University

APPROXIMATELY one-fifth of the sows bred each year fail to conceive when mated. This results in a loss or a delay of approximately 3 1/3 million litters per year. This may be helpful from the standpoint of reducing the over-all pork supply, but to the individual producer it is a real problem.

In addition to those sows that do not settle at all, there are many which conceive only after they have been rebred several times. Although conception may eventually occur. it is estimated that only about 25 to 50 per cent of "hard to settle" sows eventually produce a litter.

Then the question of "what does it cost the individual producer when a sow or gilt fails to settle?" is logically raised by swine producers.

There does not appear to be a general answer which will apply to all producers alike. For example, the producer that farrows 4 times each year (and consequently markets 4 times each year) has a different answer than the producer that farrows only once or twice each year.

The producer that mostly farrows mature sows will have a different answer than the producer who farrows first-litter gilts only. The method of marketing can also have a bearing on the answer to the question of cost involved when a sow fails to settle.

For the sake of clarity, it should be pointed out that failure to settle as used in this discussion refers to a female that is bred and returns to heat. There are other situations where a sow or gilt may settle to only a part of a litter. For example, a sow may produce a very small number of eggs at breeding time; one of the two uterine horns may be missing or blocked off — resulting in about half of the litter being lost; death of a part of or all of the embryos may occur at any stage of pregnancy; or only a small percentage of the eggs may be-

Reprinted by permission from National Hog Farmer, Box 156, Grundy Center, Iowa

come fertilized at the time of mating.

Direct Costs

Thus, there are many reasons why a sow or gilt fails to settle or only partially settles when bred, just as there are many answers to the question of cost (loss) — depending upon the particular type of management involved on the farm.

Some of the direct costs involved can be illustrated by using as an example, one sow that has been bred once and has returned to heat 3 weeks later. She can be rebred, but as pointed out earlier, the chances are 50 per cent or less that she will settle to the next service. This sow will probably consume an average of 10 pounds of feed per day during this 21-day period. If feed costs average $60 per ton (3 cents a pound), there would be an additional feed cost of $6.30 for the 3 weeks required for the sow to return to heat.

This feed cost, as well as other costs, must be charged against the next litter that this sow produces. The average litter size farrowed is about 9.4 pigs. Thus the $6.30 feed costs for the 3 weeks delay resulted in an additional cost of 67 cents for each pig in the litter which is still nearly 4 months away.

If a sow returns to heat for a second time, the feed costs go up to $12.60 per litter or $1.34 per pig, whereas rebreeding three times would be an additional feed cost of $18.90 per litter or $2.01 per pig before she settled. Furthermore, the feed costs for sows that do not settle and have to be sold will have to be charged against those sows that are kept and do produce litters.

This sheds some light on the viciousness of the repeat breeding problem to the swine producer. How many litters can afford the additional $6.30 or more in feed costs which are added because a sow fails to settle to a litter at the first service? Not very many, and furthermore, the chances may be good that a sow which requires several services to settle likely will not produce as large a litter as the sow which settles at the first service.

A pig farrowed at one and one-half pounds has only one chance in eight of reaching weaning age.

The above calculations include only the direct cost of feed. Feed costs usually make up about 75 per cent of the total cost, which would make the total extra cost nearer to $8.40 per litter or 89 cents per pig.

Also there must be some consideration given to the delay in

marketing time brought about by the delay in conception. If the market price is improving, the delay may provide an opportunity to take advantage of a rising market, but on the other hand, a declining market results in a lower monetary return.

The average number of pigs marketed per litter is 7.2 pigs. Prorating the above costs on this basis amounts to a cost of $1.17 per pig sold. This is approximately 50 cents per hundred pounds liveweight.

The producer who farrows several groups of sows per year will find that the hard-to-settle sows not only get out of step with the rest of the group, but it is necessary to keep extra sows for breeding in order to have the desired number on hand at farrowing time.

The farmer is a $14 billion customer of business and labor each year, in addition to his purchases for family living.

For example, if 20 sows are desired for farrowing, 25 sows or more will be kept for breeding. Assuming the sows eat an average of 10 pounds per head per day, the five additional sows kept on hand are costing an additional 50 pounds of feed each day. It may be possible to market these five extra sows at little, if any, financial loss, but the extra space and facilities needed to maintain them cannot be ignored.

The feed consumption of 10 pounds per day may seem excessive; however, the sows should be flushed with extra feed during the 2 to 3 weeks prior to breeding. This amount would be decreased 4 or 5 days after the sows are bred.

Ordinarily sows cannot be considered safely settled until they have gone for 5 or 6 weeks without returning to heat. Assuming the 5 extra sows are kept for the minimum of 5 weeks would result in a total feed outlay of 1,750 pounds for the five additional sows.

Logically, the question of what can be done to avoid or to decrease these losses should be dealt with. In many cases there is no alternative except to dispose of the female, but this is usually done only after the loss has already occurred.

In some cases it may be possible to correct or to avoid the situation, therefore it is helpful to know why and how some sows fail to settle. There seems to be many reasons for this, but some of the more important ones include such things as reproductive diseases, anatomical defects in the reproductive tract, cystic ovaries, improper mating and

partially infertile or infertile boars.

Failure to settle because of certain reproductive diseases is almost inexcusable today because there are adequate facilities available for testing for both leptospirosis and brucellosis. Either or both of these diseases can cause heavy reproductive losses.

To avoid such losses the breeding herd should be tested at least once a year and preferably 3 weeks prior to every breeding season. These diseases can be transmitted in many ways, including other animals and birds, therefore the simple fact that no new breeding stock has been brought onto the farm is no safeguard against a disease outbreak and should not be used as a reason for not testing. These two diseases are characterized by many different symptoms which range from difficulty in settling to abortion at various stages of gestation.

The percentage of females with defects of the anatomy of the reproductive tract varies considerably from one age group to another. In older sows the incidence of abnormalities is much lower than in gilts because there have been opportunities to cull poor performing sows at each previous litter.

Eight to 10 per cent of the gilts being bred for the first time may have some type of defect in the reproductive tract. Some of these can be detected by careful examination but in most cases it is impossible to detect it before breeding begins. Some of these defects will result in bleeding whenever mating is attempted, or there may be evidence of pain during the mating process.

These and other similar symptoms should serve as a warning that reproductive losses are likely to occur. However, there does not appear to be any fool proof method by which losses due to anatomical defects can be eliminated completely.

Cystic Ovaries

Cystic ovaries occur in 5 to 10 per cent of female swine. There does not appear to be much difference between sows and gilts in the frequency of this condition. A cyst usually forms whenever the follicle (blister like structure on the ovary) does not rupture to release the egg from the ovary at breeding time.

It appears to be caused by improper hormone levels, therefore it is difficult to correct the situation or for that matter, it is diffi-

Use an electric debeaker, even on laying pullets, if they develop cannibalistic tendencies, advise poultry scientists.

cult to accurately diagnose. It may be suspected, however, if a sow has an unusually long heat period (5 days or more) or if she has irregular intervals between heat periods. Sows with cystic ovaries may also take on the traits and habits of the boar and may do an excessive amount of riding.

The cause of cystic ovaries is not completely understood, but is is known that some situations seem to increase the incidence of cysts on the ovaries of sows. For example, it has been shown that early weaning (3 weeks of age or earlier) tends to increase the incidence of cysts — particularly in some lines of breeding. It has also been shown that under normal conditions there are more females with cysts in some lines of breeding than in other lines. This suggests that the tendency for the condition is heritable and that selection pressure should be applied against it when replacements are selected. In other words, gilts from sows that have a suspicious history should not be kept in the herd.

The average life expectancy of a child born in the United States is 69.6 years, an 11-year increase over life expectancy in 1936.

Certain types of feed are thought to bring about a cystic condition in swine. For example, certain molds that are found in corn are known to have estrogenic activity and therefore may bring about a hormone imbalance which could result in cystic ovaries.

Low Fertility of Boar

Failure to settle because of low fertility in the boar is not easy to detect. A boar may be fertile enough to settle a few sows each week but will fail in part or completely when he is bred to a large number of females. It is virtually impossible to pinpoint low fertility in the boar without making exhaustive tests under laboratory conditions.

It is possible to detect sterile boars by breeding them to a few market gilts a month or 6 weeks before the breeding season begins. If the gilts do not return to heat, the chances are good that the boar is fertile.

Poor Management

Failures to settle are in some cases the fault of the producer. Too many sows per boar when pasture mating is a common fault. Mating at the wrong time when hand coupling is another cause of infertile services. Sows can be bred too early or too late in the heat period. The afternoon of the first day of heat or the

morning of the second day appears to be the best time for breeding.

The number of sows that a boar should be allowed to run with for pasture breeding is very indefinite because of the difference in the capacities and habits of boars. Some boars may tend to follow the same sow until she goes out of heat, thus ignoring a second or third sow that may be in heat at the same time. This reduces the chances of the second and third sows being bred at the proper time. This makes it necessary for the producer to observe the habits of his boars to determine whether all sows are being bred.

Some boars have been observed to have a preference for females of a certain color, therefor it should not be taken for granted that because a boar is running with sows on pasture that this is a guarantee that all of them will be mated.

At the present time the best way to avoid disappointment is to observe good management practices, including the use of clean, high quality feeds and careful attention to the herd during the breeding season. The selection of production tested replacements with a history of good breeding cannot be overemphasized as the pressure for efficiency continues to increase.

The simplest and most reliable method for determining lime requirements for your soil is to have a soil test made every two or three years. Sandy soils in lime deficient areas require more frequent applications of limestone than clay soils.

SAFETY FACTS — Of the 480 persons killed in motor vehicle collisions with bicycles, 380 were between the ages of 5 and 14. The death rate in rural traffic accidents at night is three times that of the daytime rate. Forty-seven per cent of rural pedestrian deaths occurred while crossing between intersections. There were 27,000 people killed in traffic accidents in rural areas (includes towns under 2,500 population) in 1958; 2,900 of these were pedestrians; 900 deaths were in the 0-4-year-old group and 1,300 deaths were in the 5-14-year-old group. October ranked among the worst months in which traffic accidents occurred. Saturday was the lightest day of the week.

—West Virginia Extension

How Much Water For Corn?

Suppose you could order perfect weather for growing corn in 1960. What would you ask for?

Condensed from Wallace's Farmer

THE yield of corn usually goes up with an increase in water use.

This is not because corn doesn't get enough total rainfall. Our total is adequate for high yields. But distribution of the rainfall is often far from the most favorable.

July and August rainfall normally falls far below needs of the corn plant in most areas. That's the period during which subsoil moisture is needed to carry the crop thru to top yields.

Robert Shaw, Iowa State College climatologist, has been comparing corn yields with water use (see table at end of article). Water use is figured as subsoil moisture plus all of the precipitation from April 1 to November 15.

In each year, yield levels tended to go higher with increasing water use. But year-to-year yields for each moisture level may vary widely. This is partly because of temperature and distribution of precipitation.

The importance of temperature was shown in a recent irrigation experiment. Water was applied so that it was not to be a limiting factor. The more days with temperatures over 90 to 95 degrees, the lower the yields. This was true even when the hot days did not come during the critical silking and pollination period.

Unfortunately high temperatures are often coupled with dry periods and perhaps high winds. Yet, shortage of moisture alone is enough to clamp a ceiling on yields.

In another test, corn was subjected to dry periods. One week of severe moisture stress was applied. When it came early during the growth or vegetative stage, yields dropped 25 percent below normal.

When the moisture stress occurred during pollination, it chopped yields in half.

Later, when the corn was in

Reprinted by permission from Wallace's Farmer, 1912 Grand Avenue, Des Moines 5, Iowa

the ear stage, a similar moisture stress brought a 21 percent cut in yield.

It's during periods when rainfall is short that subsoil moisture can come to the rescue. In fact, an inch of available moisture in the soil is worth more than an equal amount of precipitation. Part of the precipitation is lost as runoff and evaporation.

During years when moisture limits yields, an inch of subsoil moisture is worth 12 bushels of corn, figures Shaw. In one test, corn following soybeans went into summer with 2 inches more subsoil moisture than corn following meadow. Yield was 25 bushels per acre higher with the extra moisture.

In another case, 1½ inches more subsoil moisture brought a 20 bushel increase.

Suppose you could order perfect weather for growing corn. Just what would you ask for? Shaw thinks this would be about ideal:

MAY: warmer and a little drier than usual.

JUNE: normal temperatures but a little more rain.

JULY: temperatures below normal — never over 90 to 95 degrees — and above normal rainfall (about like 1958 without floods).

AUGUST: temperatures cooler than normal and about an inch more than average rainfall.

SEPTEMBER: warmer and drier than normal to mature and dry the crop.

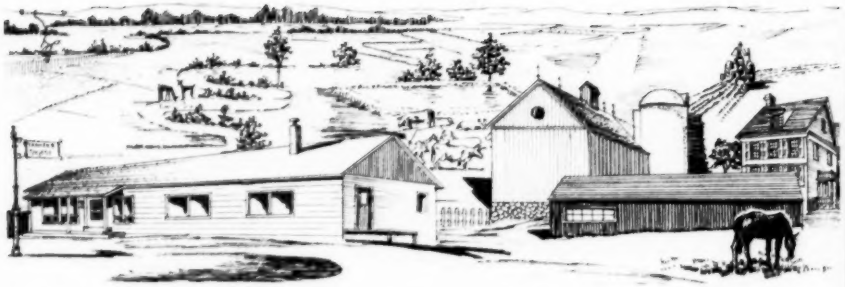
OCTOBER: drier than usual to remove moisture from the crop and permit fast harvest.

EFFECT OF WATER USE ON CORN YIELDS

Water use	1954-56	1957	1958
Under 17.5 inches	30 bu.	57 bu.	58 bu.
17.5 - 19.9 inches	48	—	—
20 - 22.4 inches	64	80	89
22.5 - 24.9 inches	75	92	105
Over 25 inches	88	90	108

My recent trade development and good will trip to Europe left me more than ever impressed with the fact that the American people owe a special debt of gratitude to our farmers and ranchers . . . Their productivity has not only supplied abundant quantities of food to consumers and raw material to industry; it has also released manpower for the needs of the total economy, which has given America the highest standard of living in all history.

—Secretary of Agriculture Ezra Benson



Here's a sketch of our farm where we publish Farmer's Digest. Our 200-acres are planted to corn, alfalfa, grass and trees. We farm — and we publish our magazine on a farm — because we believe that's the only way we can know what other farmers want to read. Farmer's Digest is probably the only farm magazine in the world published on the farm by farmers.

FUN ON THE FARM

A Collection of Jokes and Humorous Farm Stories

Every morning for years, at about 11:00, the telephone operator in a small lumber town received a call from a man asking the exact time. One day the operator asked why.

"I'm foreman of the local sawmill," he explained. "Every day I have to blow the whistle at noon, so I call you to get the exact time."

The operator laughed. "That's really funny," she said. "And all this time we've been setting our clock by your whistle."

★ ★ ★

Another way to get a wrong answer is to ask a woman her age.

★ ★ ★

APRIL 15

365 days in the year
you work like the devil to make it.
And just when you're ready
to start eating steady
the government's ready to take it.

—*The National Grange Monthly*

★ ★ ★

One way to make your car run better is to get the price on a new model.

"Haven't you got anything to do today?" the village storekeeper asked a dead-beat customer loafing in his store.

"Naw—too wet to plow," said the customer in a hurt tone, "and the banks are to slick for fishin'."

★ ★ ★

Think how a mother kangaroo must feel on a rainy day when the kids can't play outside.

★ ★ ★

Little Mary, on a visit to her grandparents, found the oldfashioned grandfather's clock in the hall a source of wonderment. While standing before it, her grandmother called to her from the next room, "Is the clock running, dear?"

"No, Ma'am," Mary promptly replied. "It's just standing still and wagging its tail."

★ ★ ★

Russia may beat us to the moon with a man-driven rocket. But when they arrive, imagine their surprise when they see our well-established Foreign Aid office.

—*Milking Shorthorn Journal*

HORSE LAUGH

When the auto came in, they
said he was done—
But the day of the horse had
just begun . . .
Now he rides behind in a
trailer-for-one!

—Maude Rubin in The Farmer-Stockman

★ ★ ★

An angry little man strode into the postmaster's office. "For some time now," he shouted, "I've been getting threatening letters, and I want something done about it!"

"I'm sure we can help," soothed the postmaster. "That's a federal offense. Have you any idea who is sending you the letters?"

"Indeed I have!" snapped the little man. "They all come from those income tax people."

★ ★ ★

People will believe almost anything if you whisper it.

★ ★ ★

A farmer bought two hammers at a general store and shortly returned to buy four more. He came back later to buy 8, and then to buy 16. This time the merchant asked him what he was doing with all the hammers.

"I'm selling them," the farmer replied.

"What are you getting for them?" the storekeeper asked.

"A dollar and a quarter."

"Man, you can't make any money that way," the merchant protested. "You're paying a dollar and a half for them."

"It still beats farming," the farmer replied.

Mrs. Joe Shepherd, The Progressive Farmer

★ ★ ★

An ad in a London newspaper read: "Sprinkle this magic mixture on your flowerbeds and nothing will grow, thus leaving you with plenty of leisure for other things." *—A. I. Digest*

★ ★ ★

A vegetable grower during a drought was extremely concerned, and an acquaintance told him that he looked worried.

"You're exactly right," the man admitted. "I'm booked solid on worries. Why, I've got so many worries on my mind that if anything occurs today, it'll be 10 days before I can get around to worrying about it!"

—Vee-Gee Messenger

★ ★ ★

A posse had just captured a hoss thief and were preparing to string him up. One member of the crowd spoke up, "May I say a prayer for this man?"

The deputy in charge of the posse protested vigorously. "Are you trying to sneak this varmint into Heaven when he ain't even fit to live in Texas?"

—Implement & Tractor

A salesman was driving along a mountain road when he came to a ford. A native was standing by the little stream where some ducks were swimming. The salesman asked, "Friend, can I get through the creek with this car all right?"

"Yes, sir, just drive right on through."

Thus encouraged, the salesman drove into the stream, only to find that the water was so deep that it flooded his engine. He and his companion had to get out with the cold water up to their armpits and push the car to the bank.

The salesman turned and said, "What do you mean by telling me I could drive through that creek?"

"Well, sir," replied the native in surprise, "I never knew that the water was so deep. Why, it comes only halfway up on my ducks!" —*Sunshine Magazine*

★ ★ ★

The husband who put his foot down probably had it on the coffee table.

★ ★ ★

Sitting at home, having a quiet evening, were two spinster sisters. Suddenly one looked up from the paper she was reading and commented: "There's an article here telling of the death of a woman's third husband. She has had all of them cremated."

"Isn't that life for you?" said the other. "Some of us can't even get one husband, while others have husbands to burn."

—*Arkansas Valley Journal*

★ ★ ★

Sending them up in rockets seems a rather expensive way to get rid of mice.

★ ★ ★

A free-advice-seeking woman asked a farmer what would be good to plant in a spot that gets very little rain due to overhanging leaves, has too much late afternoon sun, has clay soil and is on a rocky ledge.

"Lady," he answered, "How about a nice flagpole?"

—*Butter-Fat*

★ ★ ★

A successful man is one who spends more time taking the bull by the horns than shooting it.

★ ★ ★

Two rabbits were being chased by a pack of dogs when one turned to the other and said:

"What are we running for, let's stop and out-number them."

"Keep running, keep running," yelled the other one. "We're brothers."

—*Holstein-Friesian World*

★ ★ ★

Said the hired man: "I've been with you 25 years, and I've never asked you for a raise before."

Retorted the farmer: "That is why you've been here 25 years!"

The only horse that showed up for the county fair race was an old rheumatic nag belonging to an elderly farmer. The horse had never won before but now, with no opposition, the owner saw a splendid opportunity to win some prize money. The starter's gun popped and the farmer galloped the wheezing horse around the track. He crossed the finish line with a flourish and kept right on going, to circle the track twice more. A judge ran out at the quarter pole and yelled at him.

"Hey, what's the idea? You've won. What's the idea of going around again?"

"Well," roared the valiant old jockey, "as long as I'm out here, I might as well take second and third place, too."

—Wall Street Journal

★ ★ ★

A 3-year-old girl was learning to count, and when she was asked how many feet the horse standing nearby had, she replied: "Two behind and two befront."

—Badger Farm Bureau News

★ ★ ★

During World War II, a bright young farmer in the Army overseas received a letter from his wife wanting to know how she was going to plant the potatoes in the east 40 without help.

The s o l d i e r wrote back, "Whatever you do, dear, don't dig up the east 40. That's where the guns are buried."

As is customary in wartime, his letter was read by the censor. Not long after he received a reply from his upset young wife saying, "A company of soldiers overran the east 40 and dug it all up. What shall I do now?"

"Plant the potatoes!" came his reply. *—The Lion*

★ ★ ★

A teacher took her young flock to visit a farm yard. One of the first graders saw through the scheme. He turned to his buddy and said, "Don't wook, don't wook! If we wook, we will have to wite about it tomorrow."

—The Balance Sheet

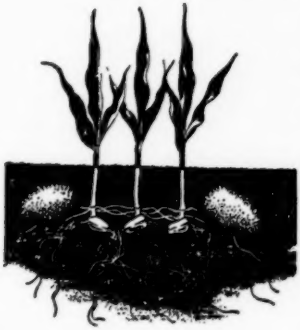
★ ★ ★

These days there are too many people in too m a n y cars in too much of a hurry going in too many directions to nowhere for nothing.

Costs Are Rising

Farm machinery investment and operating costs have increased 300 per cent since 1940. Penn State agricultural engineers report that one-third of all farm expense today is for machinery. Twenty years ago it was one-fourth. The purchase of larger equipment has contributed to rising costs.

Corn Seed Treatments Tested



You get better germination with treated seed . . .

Condensed from Arkansas Farm Research

J. L. Dale, Assistant Plant Pathologist, University of Arkansas

TREATING corn seed with fungicides has been shown repeatedly to protect the seed from pre-emergence decay and to give increased stands.

Thus, practically all corn seed is chemically treated before it is sold by seed dealers. Since fungicides differ in their ability to prevent seed decay, new fungicides are continually being tested to discover better seed treatment materials.

In work reported at the University of Arkansas, the testing was done by a method which is rapid, simple, space-saving, and severe enough to detect the best materials. This method consists of first putting a ⅛-inch layer of field soil on a double layer of wetted paper towel. Fifty seed of a treatment are evenly spaced on the layer of soil and covered with a single wetted towel. The layers are then rolled up and put in a closed container for incubation and germination.

To simulate the severe environmental conditions often encountered at germination time in the field, the rolled towels with seed are first incubated for 10 days at 50°F. During this cool storage period corn kernels germinate very slowly, but seed rotting fungi can grow readily and penetrate unprotected or poorly protected seed. After cool storage, the seed are incubated for 4 to 5 days at 80°F. At this favorable temperature unaffected seed rapidly complete germination. Counts are then made.

Even under rather poor growing conditions, perfectly sound seed germinate fairly well without seed treatment. However, during mechanical picking, shelling, etc.. some seed are chipped

Reprinted from Arkansas Farm Research, University of Arkansas, Fayetteville, Arkansas

and many develop numerous breaks in the percarp (seed coat). Such injured seed usually germinate rather poorly and thus need the protection given by a good fungicide.

In these tests, sound seed, seed with the crown removed, and seed with a pericarp injury over the radicle (root) area of the embryo were used.

Soil used in the tests was obtained from corn fields in Lee, Little River, and Washington counties, Arkansas. The seed treatment materials were all applied in the slurry form at rates recommended by the manufacturers.

Results of a typical test, in which soil from Lee County was used, are given in the table. Germination of untreated sound seed was rather high, but it was increased significantly by all the fungicides. In the cases of untreated seed with the crown removed or pericarp injured, germination was very poor. All fungicides significantly increased germination of such seed.

Although there were statistically significant differences in germination between some of the fungicide treatments, for practical purposes germination rates from all were satisfactory.

Fungicides that appear to be superior when tested by the rolled towel method can later be included in field tests. Seed treatment tests conducted in the field this spring indicate that field test results are comparable to those obtained from cold testing in the laboratory by the rolled towel method, indicating that the latter method is reliable for screening materials. Following favorable performance in repeated field tests, new fungicides that have performed satisfactorily can then be added to the list of those now recommended.

Effect of Different Seed Treatment Materials on Germination of Sound and Injured Seed as Revealed in Tests by the Rolled Towel Method

Seed treatment	Seed condition		
	Pericarp sound	Pericarp injured at crown	Pericarp injured over radicle
	Number of seed germinating*		
Arasan	47.3	49.0	49.8
Captan	47.8	48.8	50.0
Chemagro D-113	44.0	47.5	50.0
Chemagro D-272	47.0	49.0	48.0
Chemagro B-1843	48.0	48.8	49.5
Phygon	46.3	47.3	45.0
None	39.0	4.0	6.5
L.S.D. at 5% level, 2.0 seed; at 1% level, 2.7 seed.			

*Figures represent mean germination from 4 replications of 50 seed each.

How To Check Your Corn Yields In The Field

Step-by-step instructions help you estimate corn yields accurately . . .

Condensed from Capper's Farmer

HERE is a method to accurately compute your corn yields. It is suggested by the De Kalb Organization and used by their fieldmen, dealers, and customers.

Here's how you do it:

1. Husk 1/100 of an acre. The table below shows how much row to measure off to arrive at that figure.

Row Width	*Drilled or Hill-Dropped*	*Checked*
28"	186 ft.	80 hills
30"	174 ft.	70 hills
32"	163 ft.	61 hills
34"	154 ft.	54 hills
36"	145 ft.	48 hills
38"	137 ft.	43 hills
40"	131 ft.	39 hills
42"	124 ft.	35 hills

To insure accuracy, husk 1/100 of an acre at 3 or 4 different places in the field; or you can divide the length of row into 2 or 3 parts and husk each part from a different area.

2. Multiply the weight of ear corn you husk from 1/100 of an acre by 100, and divide by the pounds per bushel as determined by moisture percentage. The table below shows the pounds per bushel of ear corn at various moisture percentages.

Pounds of ear corn required to yield a bushel of shelled corn (56 lbs.) at the various moisture percentages.

% Moisture in Grain	Lbs. of Ear Corn per Bu.	% Moisture in Grain	Lbs. of Ear Corn per Bu.
10.0	63.7	24.5	80.5
10.5	64.1	25.0	81.2
11.0	64.5	25.5	81.8
11.5	65.0	26.0	82.5
12.0	65.4	26.5	83.2
12.5	65.9	27.0	83.9
13.0	66.4	27.5	84.5
13.5	66.9	28.0	85.2
14.0	67.4	28.5	85.9
14.5	67.9	29.0	86.6
15.0	68.5	29.5	87.3
15.5	69.0	30.0	87.9
16.0	69.6	30.5	88.6
16.5	70.2	31.0	89.3
17.0	70.8	31.5	90.0
17.5	71.4	32.0	90.7
18.0	72.0	32.5	91.4
18.5	72.6	33.0	92.1
19.0	73.2	33.5	92.8
19.5	73.9	34.0	93.5
20.0	74.5	34.5	94.2
20.5	75.2	35.0	94.9
21.0	75.8	35.5	95.7
21.5	76.5	36.0	96.4
22.0	77.1	36.5	97.2
22.5	77.8	37.0	97.9
23.0	78.5	37.5	98.6
23.5	79.2	38.0	99.5
24.0	79.9	38.5	100.2

Example: Weight of 131 feet

Reprinted by permission from Capper's Farmer, Topeka, Kansas

of row in drilled corn (40-inch rows) is 78 pounds. Moisture is 24 percent. 78 x 100 equals 7,800 pounds. Divide by 79.9 (weight per bushel of 24 percent moisture corn). Yield is 97.6 bushels per acre, dry-corn basis.

Corn Alone Can Become Your Most Expensive Ration

Protein is one of the many nutrients needed by hogs. The amount of protein needed is greater than the amount which occurs in grain, therefore a hog feeder buys protein in a supplement to make up for the protein his grain doesn't have.

HOG NEEDS 12%

Corn normally averages around 8.5% protein. A growing hog needs around 12% protein in his complete ration. Knowing this, you can see how wonderful it would be to produce corn with 12% protein so that you would not have to buy any extra protein.

Plant breeders have thought about this. In fact, they have bred strains of corn that produce grain with 12% protein and some strains up to even 15 or 16% protein. Why haven't these high protein corns taken over the normal protein corn?

The reason is that there is a difference between quantity of protein and quality of protein. Just because there is 12% (or even 15%) protein in corn, it's no sign that this corn is any more valuable than an 8.5% protein corn. In fact, Illinois and Nebraska tests show this very thing to be true. It takes just as many pounds of a protein supplement to supplement the high protein corn as the normal protein corn.

SHORT IN AMINO ACIDS

Corn protein is comparatively short in 2 of the 10 amino acids (amino acids are the building blocks of portein) needed by growing hogs. When corn is bred to have 12 or 15% protein instead of 8.5% protein, apparently the higher protein corn contains no more of these 2 limiting amino acids than the normal protein corn.

Most grain (milo, corn, oats, etc.) are short in the same amino acids. Therefore, it takes the same type and amount of protein supplement to balance the protein in a ton of any of the grains, even though the protein in the grains varies. —*The Feed Lot News*

How Is Your Bull's Kinsey Report?

Check your bull and know for sure.

Condensed from
National Livestock Producer

Stewart H. Fowler,
Louisiana State University

DO you have a "dud" in your bull battery?

Now's the time to find out. To wait may cost you in late-born calves and in a low calving percentage.

If you are a typical American cattleman, you run four bulls to each hundred cows. Experience taught you that this was sufficient "bull power" for good breeding efficiency under average conditions. But, an infertile bull will reduce your bull power. It's similar to a fouled-up spark plug reducing your car's horsepower. Your cow herd and your car's engine both operate below capacity.

Granting again that you are a typical cowman, you turn bulls with your cow herd in April or May. So, you still have time to cull your bovine duds from your studs.

How do you secure your "Kinsey Report" on bulls? Several weeks before your regular breeding season, you could mate each of your bulls with two to five heifers. Within 45 to 60 days, your veterinarian can detect pregnancies by rectal palpation. Any bull with an "open" set of heifers automatically loses all claims to a range-land harem during regular breeding season.

Give Bull Physical Exam

If you don't want to sell a number of bred heifers and want to steer clear of a spread-out calving period, there's a faster way. Fortunately, there's a second method of testing bulls that is growing in popularity. This procedure —known as "evaluating for breeding soundness"—can work for you.

We hear quite a bit these days about fertility testing. This involves only an evaluation of semen produced, so it does not uncover a number of causes of infertility. A bull may be infertile because of lack of sex drive, inability to mount, incompleted copulation, or production of poor quality semen. Thus, fertility testing is only one step in the evalua-

Reprinted by permission from National Livestock Producer, 139 North Clark Street, Chicago 2, Ill.

tion of bulls for breeding soundness.

In addition to an evaluation of their semen, a physical check is made of bulls for ailments and conditions that might handicap their ability to serve cows. This includes a clinical examination of the reproductive organs. Finally, the herd's reproductive history may be considered.

The classification of a bull for breeding soundness should begin with a physical examination. Special note is made of any abnormalities of vision, motion, limbs, and conformation that may handicap the bull's ability to locate cows in heat and to service them.

Don't overlook the feet and legs. The old saying "no feet, no horse" is equally applicable to bulls. Overgrown or tender feet cause so much pain that a bull will not travel to locate females in heat and poor feet will cause him to hesitate to mate.

Arthritis and rheumatism can cause such severe pain in a bull's legs that he will not attempt service. Extreme sickle hocks lead to excessive leg strain during mounting. There is a strong probability that an extremely sickle-hocked bull will go unsound in his hind legs before the end of the breeding season. Thus, this defect of conformation should be avoided.

Bulls receiving too rich and bulky feed and too little exercise may grow fat and clumsy and develop a "pot-belly." An over-sized hanging belly may cause the penis to be thrust too low at mating. If detected soon enough, this condition can be corrected before the start of the breeding season by reducing the bulk of the bull's ration.

By palpation (examination by touch) of the scrotum and its contents, your veterinarian can detect changes in the size, shape, and consistency of the testicles and epididymes. Likewise, abnormalities of the seminal vesicles and ampullae can be detected by rectal palpation. Among the most frequent abnormalities are testicular hypoplasia and inflammation of the epididymes and seminal vesicles.

Chemical analysis may often disagree with the most "expert" forage judge.

Smaller size of one or both testicles indicates testicular hypoplasia. The decreased size is due to a wasting away of the sperm-producing part of the testicle. Hypoplasia of both testicles usually leads to complete sterility. If only one testicle is affected, the bull's conception rate remains close to normal. Since this condi-

tion is known to be hereditary in several breeds, cull affected animals to prevent further spread of the condition.

Semen Check Determines Fertility

Inflammation of the epididymis is called epididymitis. The epididymis is a highly twisted tube resting on the surface of the testicle. It serves as a storehouse for sperm. Epididymitis sometimes occurs in bulls that have shown normal fertility through several breeding seasons. Palpation of the scrotum of affected bulls reveals one or both epididymes to be swollen and tender. The swelling is hard and painful to the touch. A semen examination shows sperm that are largely or wholly dead. The condition is apparently due to infection and is difficult to correct. It will pay to replace affected bulls before your breeding season begins.

National farm output has increased about 2.5 per cent annually since 1950.

Seminal vesiculitis is the term your veterinarian uses for an inflamed condition of the seminal vesicles, which are seminal fluid sacs that empty into the seminal ducts. Rectal palpation of these saclike organs in affected bulls reveals enlargement and irregular, nodular swelling with extreme sensitiveness. Such bulls show hesitancy in ejaculating semen and give a greatly reduced volume of seminal fluid. The vesicular fluid from the diseased organ apparently devitalizes the sperm; a semen check reveals sperm that are feeble or non-motile. Replace such bulls for the coming breeding season.

If an electro-ejaculator is used to collect semen for a fertility test, the penis is usually protruded while electrical stimulation is applied. While thus accessible for examination, the organ should be carefully checked—look for a "broken" penis, blood tumors, or adhesions that must be corrected before the bull can render a successful service.

Test Bull's Sex Drive

Occasionally, when a bull makes the violent copulatory thrust, the penis may become caught against the side of the vulva, thigh, or elsewhere. The force doubles the organ sharply upon itself, thus "breaking" it or causing serious injury. Such an accident injures tissues so that the "broken" organ remains curved or bent at an angle so that copulation is difficult or impossible. The portion of the penis beyond the point of injury may not become erect, thus rendering the animal useless as a breeder. Sometimes the injury causes inflammation of the prepuce, which

may lead to adhesions that keep the organ from being protruded. Recovery may take place in some cases, but considerable time with complete sexual rest is required.

A few bulls are unable to copulate because of failure to extrude the penis. This abnormality occurs through failure of the retractor penis muscles to relax. Thus, the sigmoid flexure, or S-curve, of the penis can not straighten out during erection and copulation. The condition is the result of an autosomal recessive gene. Cull such bulls immediately.

Check sex drive with a female that is in heat. Market heifers or cull cows can be brought into heat with hormones to serve as "teaser" animals. Or, a nymphomaniac, or "constant buller," would be of special value in checking bulls for sex drive. Measure sex drive by observing the bull's reaction time—that is, record the time elapsing between start of test and first copulation.

In general, lack of sex drive in young bulls is due to management or physical troubles. If detected soon enough, the condition can often be corrected before the start of the breeding season.

One of the most important steps in evaluating a bull's breeding soundness is the examination of his semen for number and condition of sperm cells. Secure a semen sample with an artificial vagina or with an electro-ejaculator.

With proper equipment and facilities, a trained operator can collect and evaluate semen in only 6 to 10 minutes per bull. Many veterinarians now offer this testing service. With a large number of bulls, the charge will run about $5 to $10 per bull. Remember, this represents only a small fraction of the cost of owning and using a sterile or impotent bull!

With the electro-ejaculator, the first fluid passed when electrical stimulation is applied is a rather clear, watery secretion. This fluid comes largely from the accessory glands and is practically sperm-free. Following this comes a milky fluid which contains sperm and accessory fluids. This part of the ejaculate is collected in a test tube, which is attached to a flexible plastic funnel.

Corn silage made from well-eared corn is an outstanding feed for beef cattle. Supplement it with 2 or 3 pounds of protein concentrate daily per animal.

How to Make a Sperm Count

The semen should be examined immediately after collection. It is usually evaluated on the bas-

is of four characteristics—density, motility, rate of movement, and morphology of the sperm cells. Sometimes the percentage of live sperm is determined, and a bacteriological examination might be made.

Appearance is the first characteristic observed. The ejaculate of a normal bull of good fertility is an opaque, whitish, or whitish-yellow fluid of milky or milky-creamy consistency. The semen is free of pus flakes, urine, blood, or debris.

Thick, cream-like ejaculates are usually more concentrated with sperm. Watery, bluish-white ejaculates contain fewer sperm cells. Direct sperm counts can be made with a hemocytometer, or quite accurate estimates of density can be secured with a photo-electric colorimeter. A good specimen has from 600,000 to 1,000,000 sperm per cubic millimeter or from 2.5 to 4.0 billion sperm per ejaculate of average volume.

Thoughts of fear seem to crystallize into weak and cowardly actions, which often solidify into failure; while thoughts of courage and self reliance seem to develop into constructive habits, which go far to insure success.

Sperm motility is checked next. A sample of the semen is examined on a warm slide under low-power on a microscope. Swirling, blackish waves of millions of sperm in movement indicate a good sample. An estimate of the percentage of moving cells requires use of a diluted sample. Semen samples usually have from 50 to 70% motility. Semen containing not less than 80% active sperm is rated as Good, 65% motility as Medium, 50% as Fair, and 35% as Poor.

The third characteristic considered is rate of movement. Various types of movement may be observed, but rapid, progressive movement in a straight line is desired. Some samples reveal sperm in rotary motion about a small circle or in oscillatory motion about a point. These two types of movement do not aid high conception rates.

Morphology, or appearance of abnormal sperm, is the fourth point considered in semen evaluation. Normal sperm resemble a tadpole with a head and long tail. Several types of abnormalities exist; among these are headless tails and tailless heads, coiled and bent tails, and small, large, or doubled heads. Semen samples containing less than 15% abnormal sperm are generally regarded as normal. Large numbers of abnormal sperm, however, impair fertility. With about 50% abnor-

mal sperm present, a bull is generally considered sterile.

Study Reproductive History

The number of live sperm cells can be counted by preparing a stained semen smear. Dead sperm take the stain while live ones remain clear. An estimate of about 50% dead cells indicates impaired fertility or complete sterility.

In addition to a physical check on the bulls and an evaluation of their semen, it may be necessary to review the herd's reproductive history to determine breeding efficiency of your bulls. We know that a bull's reproductive performance is influenced by the condition of his cows. Such things as nutritional status and the existence of certain infections in the cows or the proportion of heifers, mature cows, and aged cows in a bull's harem may indicate a reason for a bull's breeding record being lower than expected.

Don't expect a hundred per cent accuracy in your testing program. And, don't send a bull to the packing house just because he flunked his first semen test. An average of five or six semen samples secured over a period of three to eight weeks is a much more reliable indication of potential fertility than one or two samples.

Give Cows Pregnancy Test

Cattlemen have selected cattle for many years on such traits as conformation, head or horn characteristics, color markings, etc. In more recent years, they have included such characteristics as rate of gain, feed efficiency, and carcass merit in selecting their bulls. However, if you are not also selecting for breeding potential, you are missing part of your profits. Don't forget, this is the most vital characteristic of a breeding bull.

Select your bulls from cows that are highly fertile and heavy milkers. Don't add a bull to your battery unless his mother has calved every year. Help insure adequate sex drive by selecting bulls that are masculine in appearance.

The use of high quality planting seed is basic to successful farming. Irrigation, high rates of fertilizer, control of insects and other good production practices can be lost through the use of low quality planting seed.

Testing bulls for breeding soundness should be coupled with pregnancy testing cows and with an effective disease control program. If you will let these programs work for you, a hundred per cent calf crop is in your future!

Don't Forget That 4th Ear

Thousands of farmers are using hybrid crib corn for seed. Farm research shows they are 100% wrong . .

Condensed from Farm and Ranch

Bill Kennedy

UNLESS you have been breeding mare mules and getting a fine crop of colts every year . . . you'd better stop going to your crib for the hybrid corn you plant.

Maybe you're a go-ahead farmer, and wonder why we bring up the subject. You know—as we do—that we covered that ground years ago.

But many a farmer is doing the slickest job you ever saw of outfiguring himself on seed corn. He is forgetting half of his facts:

1. Hybrids generally out-yield open-pollinated corn, but . . .

2. You can't save seed from hybrids and win.

These findings are as clear-cut as years of research and field trial can make them. And most farmers have accepted the first of the two. Ninety percent of them in some states plant hybrid varieties (it's 100% in the Midwest). However, it now develops that we ran off and left some growers as far as No. 2 is concerned.

A report given at the winter meeting of the Southern Seedsmen Assn. in Miami indicates that in some states up to 50% of the farmers planting hybrids in 1959 planted crib corn instead of first year breeder seed. At least—they got their seed from somewhere besides seed distributors.

For example (and seedsmen point out that it is just an example—say it's just as bad in some other states), USDA Crop Reporting Service says 84% of the corn acreage in Alabama was planted in hybrids last year. At normal seeding rates, that means 236,000 bushels of hybrid seed were planted. But according to a survey and estimates by seed distributors . . . no more than 100,000 bushels of F1 (first year) seed were sold in the state.

A special committee set up at the seed meeting to investigate this serious situation described it as "deplorable"— and went on to explain why . . .

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USDA's Beltsville (Md.) Research Center says you gain 20% to 40% in yields by switching to hybrids—depending upon the varieties involved, your soil and growing practices. The Department scientists also back up evidence by the breeders that you lose about 25% in yields the first time you go to your crib for hybrid seed corn. And by the next year, you've lost all the advantages hybrids gave you.

Thousands of experiments—by government and industry experiment stations—have proved that you cut your yield by one-fourth by this practice—it's the same as throwing away every fourth ear.

The why's of it are very technical—have something to do with "throwbacks" to varieties used in the crosses during breeding. But the important thing is . . . it happens. The price you pay—every fourth ear—means you don't save the price of seed corn, and lose some wagonloads of corn.

And you can't make it up with heavy seeding—unproductive stalks take up as much space, plant food and water as the good stalks.

Hybrid corn is just like the ol' mule—another hybrid . . . It's a great friend and worker for the farmer; but no good for reproduction.

It is believed that one big reason farmers have fallen into this trap is that a few 'I'm from Missouri" farmers gave crib corn a try and were fooled by the weather. For example, if they planted crib corn in 1958 (a good corn year in most places) and compared their yields with 1957 (a bad-weather year) they probably got as much or more corn —even with a 25% cut by poor seed. They had another good year in '59, and crib corn looked good again.

But they have out-figured themselves. The only fair check is to plant the two kinds of seed the same year on the same soil with the same cultural practices. How much you made last year is no longer important; what is important is whether you want to settle for 75% of a crop this year.

Wow—Some Sow

One Landrace sow, owned by a Missouri farmer, has raised 120 pigs out of 144 farrowed in nine litters. From her most recent litter of 14 pigs, she lost only one. Her average farrowing for all nine litters has been 16 pigs. From this she has on the average, saved at least 13 pigs.

—The Hoosier Farmer

Corn Thieves In The Soil

Control these corn-belt culprits and produce a better crop . . .

Condensed from Better Farming

H. B. Petty, Professor of Agricultural Entomology, Illinois Agricultural Extension Service

DID you replant your corn last year? Were stands poor and uneven? Did your corn lodge in August, making picking difficult?

Not just one criminal insect but several are gnawing away at the seed and underground parts of corn plants in two of every three cornfields in many areas of the corn belt.

Research entomologists of state agricultural experiment stations have proved that seed-corn beetles, seed-corn maggots, wireworms, cutworms, grap colaspis, corn rootworms and other underground insects have stolen corn from farmers since the days of the pioneers.

Like all thieves, insects develop patterns of operation. The seed-corn maggot lives through the winter to emerge about corn-planting time as a fly and lays eggs on or near the corn seed. Maggots hatch from the eggs and burrow into seeds, preventing germination. Cool, damp springs favor this insect.

Two species of seed-corn beetles attack corn seeds — one is a uniform chestnut brown and the other a dark brown with a tan border stripe on each wing cover. Particularly in cool springs, they hollow out the seed and the result is no plant.

Wireworms — you haven't farmed until you've had a run-in with these creatures. They live in the soil from one to six years before maturing to the adult stage, the click beetle. Wireworms attack the seeds and also seedling plants by drilling a hole at the base of each stalk. Damaged plants usually wilt and die. If they do survive, they are deformed and stunted and no ear will be produced.

Cutworm damage may be severe in spots or scattered over an entire field. The work of small cutworms is hardly noticeable, but cutworms which are one-half to three-quarters grown are ravenous and cut down corn plants

Reprinted by permission from Better Farming, 1119 West Sample Street, South Bend, Indiana

as if they were tenpins. The loss in stand and in yield is easily measurable.

Corn planted on clover sod may have spots where plants turn purple and die or remain stunted. Tiny, white, comma-shaped grubs, called grape colaspis, devour the root hairs and the plant is unable to obtain sufficient phosphorus to grow. Grape colaspis feeding may reduce stand, but ordinarily only weakens the plants and reduces yields.

Corn may tip over from August on. Root systems are so poor that plants can be pulled out of the ground easily and the roots that remain show tunnels and surface scarification. This is an indication of attack by one of three corn root-worm species. By August, however, the worms have matured as beetles and left the soil.

Damage is readily seen when these various insects are abundant, but when present in only moderate numbers, the damage is not noticed until the corn is picked and yield is considerably less than expected.

To decrease maggot and beetle damage, plant corn in soil warm enough to promote rapid germination. If you replant after wireworms, straddle the old rows and later cultivate out the old stand. Cutworms—h'mm! Replant after the worms have left. Grape colaspis—plow clover sod early and follow with frequent discing. Avoid early planting and use starter fertilizers high in phosphate content. Control northern corn rootworms by crop rotation; plant resistant hybrids to lessen southern corn rootworm damage.

However, one practice will control all these insects. Either of two insecticides, aldrin or heptachlor, applied to the soil, will do the job. But will it pay off in yields? That's the question farmers are asking.

J. H. Bigger, entomologist with the Illinois Natural History Survey, faced this question and turned up the answer with five years of records from over 300 Illinois

Daily demand for water in the United States is estimated at 200 billion gallons. In the next 25 years this demand is expected to double.

cornfields. In each field an area was treated and another left untreated. Bigger actually counted over 300,000 plants to get his answers. When these counts were averaged for all fields, there were 718 more plants per acre in the treated sections. And the additional plants would normally increase production more than four bushels per acre. In one-fourth of the fields checked, the value of

the production increase trebled the cost of chemical and application. Another 18% of the checked fields returned twice the treatment cost. And in 24% of the fields the crop increase matched or slightly exceeded the treatment costs. Over this same period yields in 55 fields were carefully determined by hand-picking and the yield increases, treated over untreated, varied from 0% to 21% but averaged 6.8%

Replanting is costly, time-consuming and results in possible yield loss. Soil insects cause corn to lodge, which makes picking

Resistance to bacterial wilt is an important factor in choosing alfalfa varieties if a field is to be left down three years or more.

difficult and increases picker loss. Insecticides in soil mean better, more even stands and less lodging. The savings from these two factors in corn production by the use of insecticides have never been evaluated.

Which fields should be treated with soil insecticides and which ones should not be? It is good business to treat fields growing corn for more than two years in succession, corn following grass sods, river bottom or overflow fields, and fields with a history of wireworm damage. These fields probably make up the 25% mentioned above.

For this over-all soil insect complex, aldrin or heptachlor at 1½ to two pounds per acre broadcast prior to corn planting is almost a standard recommendation of entomologists in the Midwest. According to present knowledge, it should be disced into the soil immediately upon application. Row or band treatments of one pound per acre of the actual chemical at planting also give satisfactory results.

Both insecticides are formulated as sprays, granules, and in starter fertilizer. All three forms are satisfactory when broadcast over the entire field and worked into the soil immediately. Granules or sprays banded in the soil over the row at planting time are about equal in effectiveness. Insecticides applied in starter fertilizers will not control cutworms satisfactorily, but when applied with a split boot planter attachment, they will control many of the other insects. The least effective method of applying the insecticide is in starter fertilizer placed off to one side and deep.

Insect problems vary from one area to another. And you'll find exceptions to many of the suggestions made thus far. As an example, 1½ pounds of insecticide per acre will not control wire-

worm in muck soils; it may take five or six pounds. In a continuous corn rotation, rates of application can be decreased to one-half pound in the row or one pound broadcast, since rootworms are easily controlled. Each county agent of the extension service in agriculture has had experience in your area. Ask him about the local insect situation and control recommendations. The extension entomologist at your state agricultural college can also give you information.

Precise Planting Saves Soil Moisture For Corn

Planting seed corn kernels with points down and flat sides parallel to the row saves soil moisture, and may reduce production costs by increasing the yield per acre, report U. S. Department of Agriculture scientists.

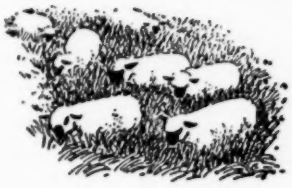
Corn researchers point out that this precision planting is still in the experimental stages, but they see no insurmountable difficulties to its future use. One method contemplated is the use of a tape to which the seed kernels would be glued in proper position. Another is the adaption of commercially available corn planters to handle and properly place each kernel as it is planted.

Precise placement of kernels takes advantage of the natural growth habit of corn leaves. The leaves develop usually on opposite sides of a stalk and at right angles to the flat sides from which each plant grows. Researchers found that "oriented" corn plantings reduced the amount of moisture-consuming sunshine striking the ground by as much as 90%. Thus, more moisture was available to the corn during the critical ear-setting stage than was the case in plots of random-planted corn. In limited tests, yields of corn from the oriented plots were as much as 3 to 23 bushels greater per acre than yields from random-planted plots.

Corn planted by the orientation method grows with its leaves in fan-like or elliptical formation at right angles to each side of a row. By extending into the mid-rows, the leaves provide ground shade that prevents the sun's heat from evaporating moisture from the soil around the plants close to the roots. At the same time, since one plant does not shade another, sunshine strikes all leaves.

—Virginia Polytechnic Institute

Rotational Creep Grazing Of Lambs



A worm-free sheep system which gives a quarter of a ton of lamb an acre in 13 weeks is explained by this English author . .

Condensed from
Farmer and Stock Breeder

H. G. Clarke

LAST year, at King's College farm at Nafferton in Northumberland, England, the rotational creep method of producing fat lambs was used on commercial scale, following several years' experimental work at Cockle Park. A 24-acre field stocked with 180 ewes and 240 lambs gave a total live weight gain of lambs of more than 6½ tons in 13 weeks.

The field used was a four-year ley and happened to be in its first full year of production. Any subsequent year of a good ley would be equally satisfactory.

Fertilizer was applied to give the maximum production. The quantity of fertilizer necessary, its times of application, as well as the seeds mixture will, of course, vary from one area to another.

The field was divided into six plots of four acres each. Several lamb creeps were fitted into each dividing fence. The total cost of the dividing fences for labour and material amounted to $224.00.

Best Age To Start

The flock started lambing very late in February. The ewes and their lambs were brought into the first plot when the lambs were from two to four weeks old, in fact on March 31. Four weeks is believed to be the maximum age at which lambs should be brought into the creep grazing unit if they are to learn to take early advantage of creep grazing.

The plot acreages are planned so that each plot can accommodate the flock for from three to four days. It is of considerable importance that the initial stocking of the plots is sufficiently heavy so that the plots are eaten hard down in this period.

As it is, the ewes, during the latter part of each period, are naturally on a falling ration; but it is so short a time that there is no apparent fall in milk pro-

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Farmer and Stock Breeder, Dorset House, Stamford Street, London, S. E. 1

duction. To increase the time allowed for grazing the plots would increase the duration of the falling ration in each period. This could seriously affect the ewes' milk.

When the flock has been in one plot for about three days, with the lambs creeping into the next plot, the grass is well bitten down. But a further 12 hours is allowed for the ewes to tread the dung into the soil. By this time the plot is almost black.

The flock is then moved forward into the next plot for the ewes to eat the stemmy grass which the lambs have left; but again with the lambs creeping forward into a further plot. After some 19-20 days the flock has grazed its way around to the first plot again. By this time the grass in this plot is at the ideal stage for growth for fat lamb production, of some 4 to 5 in. in height.

Compared with previous systems of rotational grazing (without creep grazing) practiced at Nafferton, the lambs have done very much better in every respect —in weight for age, weight per acre, carcass quality and health.

Even Lamb Growth

The flock managed on a commercial scale at Nafferton last year has confirmed that with the constant availability of an abundance of finer grasses (always of the same growth rate) for the lambs, there is no fluctuation of lamb growth such as obtained under a non-creep rotational system.

Under the rotational creep system, the balance of grass and milk for the lambs is adjusted naturally. For instance, during the first few weeks of their lives, when the lambs are largely dependent upon their mother's milk, the ewes need and, therefore, get most of the best grass.

But during succeeding weeks the position is gradually reversed. For then the lambs, with their growing appetite for grass and reduced need for milk, are able to consume more of the finer and more palatable grasses so necessary for their maximum growth. To avoid competition with the ewes for the finer grasses, they rely more upon creeping forward than previously. This leaves more of the less palatable and stemmy growth for the ewes at a time when they can no longer profitably use the finer grasses.

With heavy parasite infection, 25 per cent of cattle feed may be wasted.

No Flushing Needed

In previous methods the ewes at this time of the year were putting on expensive flesh which cost good money to take off and

which rightly belonged to the lambs. With the creep grazing system this no longer occurs and it therefore avoids expense of upland agistment as well as the haulage charges which were necessary to bring the ewes into store condition ready for flushing prior to mating.

Alternatively it obviates the need for removing any excess fat at home by trying to keep the ewes on bare pastures for several weeks.

At Nafferton the 24 acres supported an average of 7½ ewes and 10½ lambs from April 1 to June 30, to give a gross return of $184.80 per acre and a total live weight gain of 550 lb. per acre.

During the eight weeks ending June 30, when the oldest lambs were no more than 17 weeks old, 98 lambs had been sold fat to average 42 lb. dead weight. Of these 98 lambs, more than half were less than ten weeks old and many were twins.

The creep grazing system has led to a high degree of worm control. For the lambs this has been achieved by the provision of clean, ample and nutritious top growth of grass with its lower worm population. For the ewes, the natural tolerance of adult sheep to a limited worm burden is assisted by the rotational grazing of the plots. All of this means that neither the ewes nor their lambs are ever drenched for worms.

Worm Infestation

In addition, the same ground is not used for the creep grazing unit in two successive years. This has prevented *nematodirus* infection which had previously caused losses at Nafferton. Neither *nematodirus* nor any other worms are considered as problems in themselves, but rather as problems of management.

In spite of the consumption of large quantities of fast-growing leys there is no evidence of pulpy kidney disease in either ewes or their lambs. No preventive treatment is therefore practiced. It is believed that the absence of this disease may be due to the fact that the grass is eaten at an even growth right throughout the summer.

These results have shown that a system of rotational creep grazing, which includes a complete eating down of properly fertilized grass, followed by adequate rest periods, gives the maximum live weight gain from the pastures.

On mixed holdings such as Nafferton the rotational creep unit can contain the whole of the ewes and lambs on a comparatively small acreage from April to July. This releases more land for hay and silage and it prevents any competition by the flock with other grazing stock.

A Successful 15-Acre Farm In France

In ancient Brittany; a man on 15 acres of poor soil moves up to farm ownership . . .

Condensed from Le Journal de la France Agricole

Translated by *Harold Steiner*

THIS farm is in a region where the average farm size is 40 acres, but it has been a successful enterprise for the owner. He began as an agricultural laborer, then rented this farm, and with the earnings was able not only to purchase it, but also to improve the land and install modern conveniences in the farmhouse.

The farm is situated on a sandy red shale soil susceptible to drought, but which ordinarily produces good results because the rainfall in the region is well distributed throughout the year. When the present owner took over, the soil pH was only 5.5. The use of lime and basic slag has brought it to its present pH of 7.0 which is almost too high. In other respects the gently sloping land was in good condition and conveniently located in respect to the buildings. Rows of trees between fields had to be removed because they shaded the crops too much.

The present cropping plan is as follows:

1 acre corn
1 acre sugar beets
½ acre potatoes
3 acres wheat
6 acres alfalfa-grass mixture

Of the above crops only the wheat is sold. The rest is fed to either dairy cows or hogs. The rotation is arranged so that every second year the alfalfa-grass is plowed up, and the new seeding is placed where the other crops were before. The corn is planted by hand around the 10th of May. It is cultivated with a horse cultivator and harvested by hand about the end of October. It is chiefly used for feeding the hogs and chickens. The wheat follows between November 15 and December 1 and is drilled at the rate of about 150 pounds per acre.

There are 3½ acres of permanent pasture. The alfalfa-grass

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Journal de la France Agricole, 9 Rue des Petites Ecuries, Paris, France

mixture varies between four and six acres according to the stage of rotation. In general, the operator can count on four cuttings and one grazing per year, although in 1959—due to the very serious drought—he got only three cuttings and one grazing. After each cutting about 40 pounds per acre of nitrogen are spread. When the alfalfa is first established, 1000 pounds of basic slag per acre is applied, and another equal amount is spread the following year. The alfalfa is left in only two years. At present, the operator is considering replacing the wheat entirely by the alfalfa mixture and adding two more cows.

Livestock

The present carrying capacity of the farm is six cows and one heifer. These are all out of one original cow by artificial insemination. All the bull calves are sold for slaughter at about two months of age. The herd average is between 8,000 and 9,000 pounds with practically no concentrate fed. The cream is separated on the farm and sold at the rate of $0.70 per pound of butterfat. The skimmed milk is fed to the hogs which in addition get only corn and sugar beets. No sows are kept, but feeder pigs are purchased according to need. This is the least satisfactory part of the enterprise, because:

1. Feeder pigs are not always available.

2. It is difficult to always have the right number of pigs to consume the milk without waste and, at the same time, keep the hogs only long enough so that they will not be overfat.

Equipment

All the work is done by the operator and his family plus mutual help from a neighbor who has a similar small operation. The operator and his neighbor own the following in common:

1 horse
1 mower
1 drag
1 roller
1 seed drill
1 rake

Each own separately the following:

1 manure cart
1 harrow
1 plow

Since all this equipment is simple and easy to repair it is very suitable for this type of exchange. Only the combining of the wheat is done on a custom basis. After acquiring the farm the operator was able to modernize the house,

Industries which process, store, handle and merchandize the products of farmers employ about 10 million people.

drill a new well, put in an electric pump and plumbing, and put in an electric range, together with other labor-saving devices in the k i t c h e n . These improvements were possible because he had very little money invested in farm equipment.

Having started as an agricultural laborer this man climbed the ladder to farm ownership in France and is successfully raising a family on a small plot with an intensive system. This shows that the man himself may be more important than his environment or the soil, and even though farmers should have technical counsel, they should always be free to make their own decisions.

Study Your Corn Crop

Corn ears that come from your picker this fall can give valuable information to help you grow better and higher-profit yields next year. If the crop has been starved for needed nutrients, the ears will show tell-tale signs. For instance, small twisted ears with underdeveloped kernels can be caused by a lack of phosphate in the soil. Ears with pointed tips and loose chaffy kernels suggest a potash shortage. Nubbins with unfilled tips can be caused by nitrogen deficiency.

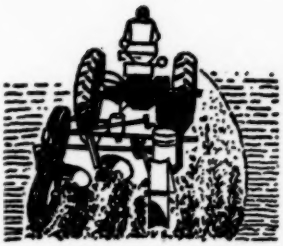
Sweet Clover-Oats Combination

You can get low cost nitrogen for your corn crop next year by seeding sweet clover with your oats this spring.

Six-year tests conducted by R. R. Mulvey, Purdue University agonomist, showed that corn yields following the sweet clover intercrop exceeded that of corn after continuous corn by 42 bushels an acre. No additional nitrogen was plowed down in either case.

For the same year, 80 pounds of nitrogen plowed down annually with the corn stalks gave a 36-bushel average increase of corn. In years when the moisture supply was short, the sweet clover sod showed its greatest contrast in yielding ability over commercial nitrogen.

However, sweet clover is subject to weevil attack. Vigorous alfalfa varieties, like the non-hardy common from the southern states, can be substituted for sweet clover and are superior to red clover in nitrogen gathering power. —*Purdue University*



Plow-Planting Corn

Plow-plant may pay if you follow the rules . .

Condensed from
American Agriculturist

Hugh Wilson

PLOW-PLANT is a term that describes a method whereby land is plowed and corn is planted in one operation.

The press wheel and shoe of the planter smooths, firms and granulates a narrow band of soil on either side of the seed. Space between the rows is left rough, loose, and untouched until the corn is big enough to cultivate. Then a cultipacker and weeder are used to destroy weeds and firm the surface. Following this the corn is handled in the usual way.

Advantages claimed for plow-plant are (1) Average yields are slightly higher than with conventionally planted corn; (2) Fitting costs are reduced five to ten dollars per acre; (3) In wet seasons corn may be planted earlier; (4) Soil is maintained in better tilth; (5) Erosion and water runoff are reduced; (6) There is less wheel traffic to pack soil; (7) Some weeds are less troublesome; (8) The first cultivation (with cultipacker and weeder) is easier and faster.

Research begun at Cornell in 1951 by Professor Musgrave indicates that these claims are correct. Many farmers who have tried plow-plant agree. Others openly scoff at it. To find out why such differences of opinion exist the Departments of Agronomy and Agricultural Engineering of New York have been conducting field trials and studying methods for the past five years. During this period growing seasons have varied from wet to dry and from cool to hot.

Comparisons have been made in most of the agricultural counties of New York. Soils have included fine textured clays, medium loams and coarse gravels at different levels of drainage. Tilth has ranged from excellent to poor. Some fields have been bare when they were plowed and planted—others have had grass and alfalfa as high as the tractor. Different planter attachments

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and fertilizer placements have been tried. Slowly but surely a pattern has emerged that seems to explain the successes and failures.

The verdict is: if plow-plant is used on land suited for corn, and a few rules are observed. there are few instances where it should not show to advantage.

1. Flexibility and provisions for adjustment must be built into the planting unit. In this assembly the long crank that carries the planter is free to rotate through a small arc. Thus, the planter may ride over the obstructions and may be moved on the crank to permit alignment with the furrow. There are many methods of attaching the planter but flexibility and alignment are always essential.

Planting seed corn kernels with points down and flat sides parallel to the rows conserves soil moisture and may reduce cost of production by increasing the yield per acre, say U.S.D.A. scientists.

2. Land must be in good tilth, as evidenced here by the absence of lumps and clods. When soil is very lumpy seedbed preparation is difficult even when the land is harrowed and fitted. With plow-plant it is impossible.

3. Good plowing is a "must." Smooth, uniform, well-turned furrows permit the planter to do the required fitting and place seed and fertilizer at a uniform depth. Plowmen who leave balks, skips and furrows on edge will do well to stick to conventional fitting.

4. Early planting is highly desirable. A week to ten days before normal planting date is about right. Late season plow plantings are usually inferior.

5. Land should not be so stony or steep that equipment will not work efficiently.

Not everyone is equipped or will care to try plow-plant. These people might consider minimum fitting, consisting of one or not more than two harrowings on at least part of the corn acreage next spring. Possibly the discovery that corn on good land does not require a fine or well prepared seedbed may justify all the work that has been done on plow-plant.

Acre Costs of Planting Methods

	Conventional	Wheel Track
Plowing	$ 3.00	$3.00
Disking	2.80(2)	
Harrowing	1.00	
Planting	1.45	1.45
Cultivating	3.69(3)	2.40(2)
Total	$11.85	$6.85

University of Wisconsin

Chimney Smoke

by Irene Rudie

It's good to have money and the things money can buy, but it's good, too, to check up once in a while and make sure you haven't lost the things that money can't buy. —*George Hanson Towne*

★ ★ ★

The electric clocks all over the house are fine, but in stormy weather when the power goes off for minutes or hours, it is the old tick-tock clock in the kitchen that keeps us straight with the world.

★ ★ ★

In fairness, new freezers should come with a bag of dog food inside, for freezers are increasing the sale of commercial dog food. You see, leftovers go into the freezer now, instead of the dog!

★ ★ ★

I love to browse in the super-supermarkets when I go to the city, to look at all the things I'll never have any desire to buy, pickled rattlesnakes, chocolate-coated grasshoppers, and Chinese birdnests, among them.

★ ★ ★

A local citizen said he looked up during a dust storm, not at the sky, for none of that was visible, just looking, and he saw a gopher digging its way past.

A man who patches his own overalls puts his wife in an uncomfortable position. People in town who observe his amateurish attempts must conclude that she made the awkward patches, or that the poor man had to do it himself.

★ ★ ★

When I see the tremendous wedges of geese flying north, I wonder how the leader who points the way was chosen. Does he change off with others in the formation, or does he keep his job for life, and does it have to be a "he" or could a female goose be a leader?

★ ★ ★

A salesman of large farm equipment landed on a neighbor's farm in a plane the other day. He took his prospect all over the state to see his machines in action and got him back home in time for chores. Such are the times we live in.

Housewives in this country spend an extra billion dollars every year just to buy household items with familiar brand names. That's how advertising pays, and that's where the money comes from.

★ ★ ★

Dogs that live in the house become very alert to the habits of the family. When our little dog sees me stuff this paper into an envelope and pick up the stamp box he will bark excitedly and run to the door, for he knows that he can go out to the mailbox with me.

★ ★ ★

The very few days when the farm is snowbound is about the only time the family finds for bringing scrapbooks and snapshot albums up to date, when there can't possibly be any interruptions from unexpected visitors.

It was Farmer Brown's first visit to the big town. In the window of the department store he read a sign: "Ladies Ready to Wear Clothes."

"Gosh," he said, "it's about time."

★ ★ ★

Now that the elm trees in the yard have dropped their leaves and the lacy branches are silhouetted against the sky, nesting places of the summer residents who brought us so much joy on summer mornings are revealed. There's a sturdy home of the robin family in a wide crotch, and a hanging basket that held baby orioles far from the reach of the most agile cat.

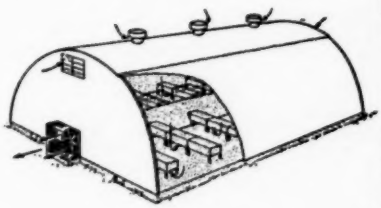
★ ★ ★

Why is it that a man doesn't mind spending hours to catch a mess of fish, but objects so strenuously to spending minutes in cleaning anything?

Ways To Wheel-Track Planting

The still new minimum-cultivation method of planting corn in the pressed-down path of a tractor's wheels immediately after plowing has proved so successful that a number of Midwest farmers devised and built equipment that will plant 4 rows at a time, making still greater savings in labor, time and fuel costs. Two methods have been used to make the 4 tracks. The most practical type has an extra wheel with spacer assembly bolted to each of the tractor wheels. This leaves tracks with approximately 40-45-40 inch spacing. Another method is to use an extension frame on the front of the tractor to space the front wheels about 10 ft. apart. Steering mechanism also has to be extended to fit. —*Sinclair Farm and Home Book*

How To Aerate Stored Grain



Drawing air through grain with electric fans prevents mold damage . . .

Condensed from
Electricity On The Farm Magazine

W. V. Hukill, Agricultural Engineer, Iowa State University, and *J. W. Simons,* Agricultural Engineer, University of Georgia

GRAIN that is dried properly for storage may not keep safely unless steps are taken to prevent damage during winter storage.

Many farmers have had the sad experience in spring of finding their grain molded and caked, especially on top, even in weather-tight bins.

Here is the reason this spoilage occurs. In the late fall and winter, as outside temperatures drop, grain around the outside of the bin and on top cools faster than grain in the center of the bin. Because of this temperature difference, moisture moves, or migrates, slowly from the warm grain in the center to the colder grain near the surface. If the grain is cold enough, moisture condenses on the kernels. Thus mold and insect activity may become severe.

Electric Fans Aerate Easily

To prevent this damage, grain should be aerated during cool, dry weather so that the grain is kept at a uniform temperature and moisture content throughout the bin. Elevator operators often move the grain from bin to bin to keep it in condition. But a more practical method for farmers is to force air through the grain. Aeration should not be confused with drying. It cannot be depended upon to do any appreciable drying.

Aeration is easy with electric fans and is low in equipment and operating costs. The cold air must be drawn down through the grain and not upward as in artificial drying. In this way the warm, moist air may be discharged directly from the bin to the outside and thus does not condense on the grain.

The volume of air needed to aerate grain is much lower than that used for drying. Reports by USDA in cooperation with Iowa

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Electricity On The Farm Magazine, 305 East 45th Street, New York 17, New York

State University and The University of Georgia indicate that from 1/25 to 1/10 cubic feet per minute (Cfm) intermittently is the volume of air needed for each bushel stored in farm bins. The fans must be of a type that will operate against resistance of the grain to air flowing through it. This resistance, called static pressure, varies depending upon depth, kind of grain and amount of air used.

Aerate Worthwhile in Small Bins?

Usually, little moisture migration trouble is experienced in small lots of grain. Therefore, it is questionable whether aeration will be worth the cost in bins as small as 1000 bushels. The volumes, static pressures and horsepower requirements suggested for two sizes of cylindrical bins are as follows:

Bin Size Bushels	Air Need- CFM	Static Pressure Inches Water	Fan Size HP
2200	100	⅜"	1/50
3300	220	½"	1/25

For continuous fan operation even less air may be used—from 50 to 100 cfm has given good control in 3300 bushel bins.

System Installed in Filled Bin

An air distribution system will be needed. If grain is artificially dried in storage, the same duct system may be used. Otherwise, provide a duct system designed for aeration. Complete systems, ready to install, may be bought or they may be assembled on the farm. A simple system may be installed after the bin is filled. The pipe may be inserted by drawing grain out with a vacuum cleaner as the pipe is pushed down into the grain. Connect the fan to the top of this vertical pipe and install a discharge pipe to carry the air out of the bin.

Start the fan as soon as cool weather begins—some moisture migration will occur if the air is as much as 10° cooler than the grain. If aeration is delayed until moisture accumulation is allowed to start on the surface, fan operation will then tend to draw the moisture to the lower layers.

In intermittent fan operation, measure the temperature of the air exhausted from the fan. When it is about the same as the outside air no further cooling can be accomplished until the outside temperature lowers.

An estimated 3.5 to 6 million cubic miles of water is perpetually locked up in ice and snow. If melted, this would raise water level of all seas some 100 to 110 feet, and submerge most of the world's large cities.

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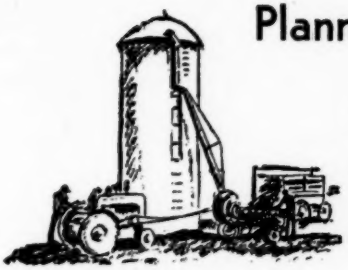


Planning A New Silo?

Here are some pointers on picking a site . . .

Condensed from Pennsylvania Farmer

Albert J. Swearingen

IF YOU were getting a new silo, how would you determine where it would be placed?

Its location can definitely influence the time and work required to fill and empty it, as well as the efficiency of both the harvesting operation and the feeding operation.

Serious consideration of the following questions regarding silo locations could save much time, labor and expense:

1. Is the site selected well drained?

2. Will the drainage from the silo contaminate other parts of the barn and work area?

3. Will the silo area be easy to clean at filling time?

4. Can the filling blower be set up conveniently?

5. Can loaded wagons be put into unloading position without turning or backing up to the blower?

6. Will empty wagons leaving the silo be in the way of incoming full wagons?

7. Will silo loading port permit the blower to be set up so that wagons can be pulled into correct alignment without jockeying around?

8. How far will the silo be from where the silage will be fed? Can it be located closer without imparing other phases of the operation?

9. Will the silo be located and situated in such a way that a mechanical feeder could be connected to it?

10. If the need should arise, can another silo be located next to the original one and use the same mechanical feeder for both?

11. In the chosen location, will it be possible or practical to use the same silo unloader in more than one silo, either now or in the future?

12. Will this location impair or prevent future expansion of the barn or other needed buildings?

13. Is the route from the field direct? Or will there be many gates to open, corners to turn,

Reprinted by permission from Pennsylvania Farmer, Harrisburg, Pennsylvania

and narrow alleys to drive through?

14. If the silo is intended for feeding the cows in a stall barn, will the location selected permit using a mechanical feeder inside the barn?

15. Does this location combine the job of handling silage and hay in such a way so as to minimize the time and distance required for each material?

It is doubtful whether a location can be found that would answer all these questions in the ideal fashion. But the greater number that are satisfied in the ideal way, the more effective the location will be. Remember that all the requirements are interrelated with respect to the total farm operation.

Harvest time is short. Any delay at the silo is automatically a delay in the field. An example in point is, if the field harvester has a capacity of 20 tons per hour and poor location slows down the silo filling process to ten tons per hour, then the chopper can operate only at one half efficiency.

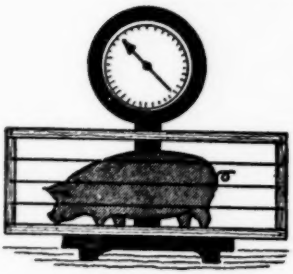
This one-half efficiency could cause the crop to overmature which in turn would reduce the nutritive value of the forage by a high percentage. Good harvesting weather is also limited, which means any slowing down during ideal days increases the possibility of loss due to bad weather.

In the development of a materials handling system, the correct location of a storage structure comes first. Conveyors and feeders come next. Often the correct location of storage can add more to the effectiveness or convenience than a conveyor or feeder. An improper storage location can add cost to the installation of a conveyor or feeder and at the same time reduce its possible effective use.

MINIMUM TILLAGE is any method of tillage to reduce trips over the field. Fewer trips result in less soil compaction by tractor and tillage implements and the loose soil absorbs more water and reduces erosion. Fewer trips reduce cost of producing the crop. Corn planted with minimum tillage is usually divided by the agricultural engineers into one of three methods: 1. Corn planter mounted on the plow. 2. Plow and then plant in wheel tracks. 3. Cultivator mounted on the tractor ahead of the planter to prepare a seedbed in the row only and leaving the middles rough. The last method appears to offer the most promise on heavy soils which are commonly fall plowed.

—Gish Agricultural Service

The Question Of Antibiotics



Answers to questions you may be asking . .

Condensed from
Canadian Landrace Bulletin

F. J. Giesler

WHAT are antibiotics? Should they be used in the swine ration? How much milk will a good sow produce during her lactation?

Let's answer these questions one at a time to try to keep the record straight.

The antibiotics or antibiotic supplements frequently used in swine rations are drugs. They are not feed nutrients.

Actually, antibiotics are substances produced by molds, bacteria, or micro-organisms. The most common antibiotics used in swine feeds are aureomycin, terramycin, and procaine penicillin. Penicillin has for years been known to the general public for combating infection.

Amounts in Feeds . . .

Amounts of antibiotics used in feeds are much smaller than the amounts used to treat acute infection. Production of antibiotics for medical purposes leaves some antibiotic residue. The residue, or products derived from it, go into an antibiotic feed supplement or premix.

The manufacturers are then obliged to guarantee the particular antibiotic with directions for use so that usually five milligrams of the pure antibiotic are contained in every pound of finished hog ration. Recommendations vary according to age and size of pig. Pre-starters contain 2 grams of an antibiotic per 100 pounds of feed, while creep rations vary from .5 to 2 grams per 100 pounds of complete ration.

Can Increase Gains . . .

In Ohio dry lot experiments, pigs on a ration that included an antibiotic were ready for market six days earlier and required 2.5 per cent less feed per 100 pounds of gain than pigs without it. Their work indicated that a sin-

Reprinted by permission from Canadian Landrace Bulletin, Family Herald, Montreal, Canada

gle antibiotic was as effective as a combination of them.

In one pasture experiment, pigs that received antibiotics went to market 2 days earlier and required 0.7 per cent less feed per 100 pounds of gain than pigs that didn't get antibiotics.

Frequently, poor management practices, inadequate rations, presence of disease organisms, or conditions of stress would permit a more pronounced response to antibiotics. Where good management is the rule, antibiotics can be removed from the ration when pigs reach 100 to 125 pounds of weight without appreciably affecting the rate of gain. However, none of the antibiotics will replace well-planned management, including the feeding of some animal by-products, the use of good pasture, or leafy green legume hay.

Vitamin B12 is frequently included with the antibiotic in the premix for both growing and breeding stock. As in the case of antibiotics, the manufacturers and distributors are required to state the guaranteed content of pure vitamin B12 in every pound of premix. Most directions call for five micrograms per pound of finished ration.

Vitamin B12 is carried in feeds of animal by-product sources, including meat scraps, skim milk, fish meal ,and tankage.

How Much Milk?

Another good farmer wants to know how much milk a good sow will produce during her lactation period. Perhaps the gentleman who raised this question had in mind early weaning of pigs.

To answer him specifically, I turned to the experimental data available and found that there was a wide range of productivity for sows, varying from 4.9 to 11.7 pounds per day. The daily amount usually reaches a peak around the fourth week after farrowing and varies from the third to the fifth week of lactation.

All newly purchased breeding animals should be isolated for at least 30 days before turning them into the herd, according to Purdue veterinarians. They recommend retesting for brucellosis and leptospirosis at the end of the 30-day isolation period.

A good sow will produce between 300 and 400 pounds of milk during the eight-week period she nurses a litter. To produce this much milk, you can readily see why it is necessary to supply a liberal amount of nutrients for her during this period.

A number of studies have been made on the composition of the sow's milk. The sow's milk is

more concentrated than cow's milk, containing much more protein and fat. It generally does not differ greatly from cow's milk in vitamins.

	Protein	Fat
Cow's Milk	3.3	3.7
Sow's milk	6.9	6.7

Even with this difference in protein and fat content, however, where herdsmen have enough patience, orphan pigs can be successfully raised by hand. It is best to feed the pig whole, sweet cow's milk five to six times daily until they are 2 to 3 weeks old. Thereafter, the number of feedings may be reduced to three a day. A number of milk replacers are on the market today that also can be used to feed orphan pigs.

Pigs that will not start to drink may be taught by pouring milk in a shallow dish and then placing the pig's nose and mouth into the milk, being careful not to continue the process so long that the pig may be strangled. Be sure to have the milk at about body temperature for the first week or two.

Trends In Wool Consumption

The world trend in wool consumption since World War II has been upward although the United States trend has been downward. Aggregate average annual mill use of wool, cotton, and synthetic fibers during 1955-57 was about 59 percent greater than during 1935-39. Cotton was up 30 percent, synthetic fibers up 425 percent, and wool up 9 percent with carpet wool up 41 percent and apparel wool down 3 percent.

There are a number of factors contributing to the decline in use of apparel wood. A shift toward lighter weight clothing has lowered the amount of fabric used per garment. Consumers have also spent less for clothing since World War II. About two-thirds of the United States market for wool is for apparel consumption so that any decline in apparel use is reflected adversely in the over-all market for wool. Synthetic fibers have made significant inroads on the place of wool in the output of apparel goods. Good quality wool, however, has many advantages for wearing apparel. The "feel" of wool is difficult to duplicate with other fibers. Its strength, durability, and qualities of holding and excluding heat are difficult to match.

In recent years the prices of high quality wool have been from 10 to 40 cents a pound above the lower quality wool. It appears that the competitive position of wool might be strengthened by the production of more high quality wool.

—Wisconsin Crop and Livestock Reporter

Deep Rooted Plants Open Up Packed Soil

Some crops have roots that condition the soil for you . . .

Condensed from
Texas Farming and Citriculture

Harold V. Stephans,
Soil Conservation Service

IS your soil cloddy or crumbly? Chances are, if it's cloddy, your soil needs reconditioning with deep roots and organic material of a soil-improving crop.

Compact or cloddy soil is a symptom that your soil is being limited in its ability to produce and resist soil erosion and deterioration. There are several temporary soil conditions which may show up as cloddiness. Check your soil to see if any of these conditions need treating on your farm.

Surface crusting is one temporary soil condition which is fairly easy to spot. If your soil surface becomes sealed over after a rain or irrigation, you need to step up the amount of organic material returned to the soil in your cropping system. Of course, leaving these residues on or near the surface will do more good than turning them under. Surface crusting slows down the entry of oxygen into the soil.

Your soil actually breathes. Surface crusting slows down this breathing which is detrimental to plant growth.

Soil compaction is another enemy of yours which drives air out of the soil creating an unhealthy condition. Every trip over your fields packs the soil tighter and decreases the amount of air space. The weight of the farm equipment as well as number of times over the field influences how much the soil is packed. If soil is plowed when too wet, several seasons may be needed to undo the damage.

The principles of treating soils in poor condition are relatively simple. Open them up with deep rooted crops such as sweetclover or perennial grasses and make the soil more porous by adding high residue crops. Fibrous-rooted an-

Reprinted by permission from
Texas Farming and Citriculture, 802 West Harrison, Harlingen, Texas

nual grasses such as oats and high-tonnage crops such as red top cane are a big help in restoring good tilth to tired soils.

Farmers cooperating with their local soil conservation districts are doing something about their soil needs.

Everett Bell, farming west of Mission, Texas, is using buffelgrass in rotation with other cash crops. He uses buffelgrass for a grazing crop before rotating with cotton or vegetables. Bell likes buffelgrass because the organic matter of buffel roots breaks down slowly, which stretches the benefits out over a longer period of time. Buffel roots were still numerous throughout the soil 18 months after the grass was incorporated, fertilized and irrigated several times.

Wilford Smith, of Harlingen, Texas, noticed a striking difference in vegetable quality as well as quantity following a soil-improving crop of Hubam clover. Carrots following clover were larger and smoother than those produced without the benefit of a soil-improving crop.

W. C. Youngblood, Raymondville, Texas, used red top cane as a soil-improving crop and soil-conditioner ahead of cotton. Nitrogen fertilizer was applied to the cane residue to prevent a nitrogen deficiency in the cotton that followed. Results were very encouraging.

"What soil-conditioning crop would be best for me to use," is a question frequently asked by farmers. That depends a lot on your particular type of farming. A person who likes to run some livestock might use perennial grasses as well as cane or oats for soil conditioning. Some cash benefits could be realized from the forage crops while they're opening up the soil and placing tons of organic material deep in the soil as roots.

Some farmers prefer deep-rooted sweet clovers which open up the soil with strong tap roots. Legumes also improve soil fertility by feeding heavily on soil phosphorus and other minerals and digesting them into available forms. As much as 50 to 80 lbs. of nitrogen is also fixed from the air which is available to the crops that follow. This nitrogen alone is worth approximately 13 cents a pound.

Entomologists are working on two new methods of controlling insect pests—sterilization of male insects by radiation and the use of attractants added to insecticides.

Ervin Richter, a Soil Conservation District cooperator, likes

to use red top cane as a soil-improving crop in the fall of the year when the land would be fallow otherwise. He thinks the economics of soil-conditioning is pretty sound.

The cost of producing a cane cover crop will run a little more than 20 dollars per acre. If the following cotton crops produce ninety extra pounds of lint cotton per acre, Richter figures that the crop will more than pay its way.

A glance at his fine cotton crop this year following cane on leveled land makes us guess that he did much better than that the first crop following cane. The good soil benefits should hold up through at least two more cash crops before another soil conditioning crop is needed.

Select the soil-improving crop that fits your type of farming and the needs of your soil. Include it systematically in your cropping system. A Soil Conservation Service technician assisting your local district is available to plan with you as to kinds of crops to use and the frequency such crops are needed to keep your soil open and your soil organisms working for you.

Grain Sorghum or Corn?

Feeding-wise, corn and grain sorghum are practically the same. The table at right figures grain sorghum at 90% of value of corn. For hogs, it's better than that. But this table is a handy, quick reference for deciding which is best buy. It works this way: If corn is $1.25 a bushel and you can get grain sorghum for $2.08 per hundred or less, use grain sorghum.

Shelled Corn price Per Bushel	Grain Sorghum Price Per Hundred Pounds
$ .75	$1.25
.80	1.33
1.00	1.67
1.25	2.08
1.50	2.50
1.75	2.92
2.00	3.33

FARMERS TODAY can produce four times as much corn for every hour of work as our Granfathers grew 50 years ago, reports R. A. Hinton, University of Illinois, Agricultural Economist. Back in 1910, a central Illinois farmer on good soil averaged 50 bushels of corn per acre, and it took 18 man hours and 46 horse hours to get the job done. Today in that area, a farmer can produce 75 bushels of corn per acre with six man hours and 5.4 tractor hours.

Don't Risk A Poor Corn Stand?

Wrong planter plates for your speed of planting may reduce your yield . . .

Condensed from
Successful Farming
William E. Gill, Agricultural Engineer, Ohio State University

HAVE you ever suspected the seed you're using, or the fertilizer, or corn planter when you've ended up with a poor stand of corn?

A figure used commonly in regard to corn mortality between planter setting and harvest time is 15 to 25%. This reduction is due to one or more factors, such as improper planter operation, seed germination, emergence difficulties, insects, cultivation problems, and weather hazards. Until now, the loss caused by *speed of planting* has not been properly recognized.

To investigate this, agricultural engineers at Ohio State University checked a sample of corn to find the percentage of kernels dropped when drilling at various speeds with the plate recommended by the seed producer. The recommended edge drop plate had given a 103% drop on the check stand, as commonly operated.

A standard planter was set up in the laboratory to drill 20,000 kernels per acre and operated at 4 different planting speeds, using 3 seed plates having cell lengths of 36/64", 40/64", and 44/64". The cell width and thickness dimensions were the same.

The chart at the end of the article shows results. As the rate of forward travel is increased, the number of kernels dropped is decreased. Sizable reductions resulted with the 36/64" plate at speeds greater than 3 mph. This was because a large proportion of the corn was as long or longer than the cell in the plate. Yet, on a 3-kernel per hill check-stand test, a drop of 103% was obtained. So the thing to do is this: If you plant at high speeds, be sure to check the kernels actually dropped with the plates recommended for your planter.

The exploratory work to date indicates the importance of calibrating your corn planter for each variety and grade of corn *at the same speed* you will use in

Reprinted by permission from Successful Farming, Des Moines 3, Iowa

planting. This can be done by jacking up the planter and cranking out several hundred kernels or by operating the planter on the ground to be planted.

To make up for the loss difference between kernels actually planted and plants per acre at harvest time, calibrate the corn planter to plant 10%-15% more kernels per acre than desired number of plants at harvest time.

Check the corn planter operator's manual or with the machinery dealer for the proper socket settings to obtain the desired number of kernels per acre.

There are other factors that affect the number of kernels actually planted per acre. More research in the field and laboratory is being undertaken to better understand the interrelationships.

Planter Speeds	Cell Length	Kernels Per Acre
3 MPH	36/64"	19,400
"	40/64"	22,120
"	44/64"	23,880
5 MPH	36/64"	16,000
"	40/64"	21,200
"	44/64"	22,600
7 MPH	36/64"	12,940
"	40/64"	20,200
"	44/64"	21,400
10 MPH	36/64"	8,200
"	40/64"	16,600
"	44/64"	18,400

How To Get The Corn Stand You Want

There is 20 to 25% loss in stand between planting and harvest. Ohio recommendations call for dropping 17 seeds for every 10 feet the planter travels (40 inch rows) to get a final stand between 17,000 and 18,000 plants per acre. This allows for normal germination, emergence, and cultivation losses.

Row width Inches	Plants required in 10 ft. of row	Seeds required in 10 ft. of row	Distance between seeds *(inches)
38	13.1	16.4	7.3
40	13.8	17.3	6.9
42	14.4	18.0	6.7

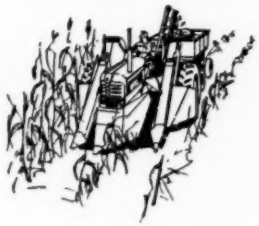
*Provides for a loss of 25%.

Remember — As you increase stand — 1. The percent loss increases. 2. The percent barren stalks increases.

Its the number of ear-bearing stalks that count! Use proper size seed plates. Slow down planter speed.

—Midwest Potash News Letter

Are Your Corn Yields High Enough?



Use this checklist to make more money . . .

Condensed from Arkansas Farmer

HAVE you taken a good look at your corn production program lately? Are your corn yields as high as they should be?

If something is lacking, look over this 14-step program, called the Pacemaker Prescription Plan for more profits from corn. Check off each item as the season goes along, or check them now on the basis of previous experience. If not enough of the points are checked, you'll find a reason or two for short corn yields. Armed with this information, you can go about doctoring the program for more healthy profits:

1. Determine the production potential for each field, as indicated by previous experience or by using an acre for test.

2. *Set a goal. Aim high. 100 bushels per acre is not beyond the reach of most farmers.*

3. Get a soil test. Advise the soil laboratory of your goal in terms of bushels of corn per acre.

4. Fertilize according to the laboratory's prescription. Use enough.

5. Lime to a pH of 6.5 to 6.8.

6. Plow down lime and fertilizer. Plow deep.

7. Apply insecticides for control of cut worms, wire worms and root worms in the soil.

8. Select a high yielding hybrid and plant enough to get your desired yield. Make sure it's a recommended variety and that it comes from a reputable source. Plant enough to get your desired yield.

9. Apply starter fertilizer two to three inches below and to the side of the seed.

10. Control weeds by cultivation or spray, but don't overdo it.

11. Control corn borers in time. Check fields often.

12. Use the tissue test to check on your application of fertilizer.

13. Make a yield check.

14. Harvest it all. Pick clean for more profit.

Sixteen thousand plants, each

Reprinted by permission from Arkansas Farmer, Box 246, Little Rock, Arkansas

producing a one-half pound ear, will make 100 bushels of corn. Because you always get some barren stalks and missing hills, plant an extra 10 *to* 15 *per cent more seed kernels. For higher yields, plant more.*

Remember too that fixed costs of corn production remain generally the same no matter what the yield. If fixed costs average $55 and you get 56 bushels at $1 per bushel, your net profit will be $1 per acre. But raise the cost to $75 per acre by adding $20 worth of fertilizer. and the yield can go up to 100 bushels, netting you $25 per acre.

All of which points out once again that it takes a little extra spending to make a lot of extra income.

Raising Dairy Heifers Is Costly Proposition

Raising dairy heifers costs money—and much more than many dairymen think, according to W. L. Northern, Extension dairyman at West Virginia University.

Starting with an initial investment of $30 for the calf, a New Jersey study found that it cost another $218 for feed and an additional $108 for labor and other items. Thus, the total cost of raising a dairy heifer to 28 months of age—the average age at first calving in New Jersey—amounts to $356, less an allowance of $18 for manure produced, or a net cost of $338.

Cost data obtained from 50 farms showed the 15 farms with the highest cost averaged $380 per heifer, while the 15 lowest-cost farms averaged $300 per heifer raised to calving. The major difference between these extremes was feed cost.

Why not buy replacements, if it it so costly to raise them, is a question that has been asked. One good reason is that you are usually less sure of a heifer's inherited ability to produce in a purchased animal than if you raised your own, Northern said.

"Dairymen should remember these facts," he continued. "It costs money to raise heifers so make sure that you start with good ones. Feed heifers well and grow them out rapidly so they will start repaying you for your investment at an early age. Heifers from the early-maturing breeds—Jersey, Guernsey, and Ayrshire—should be bred to calve between 21 and 25 months of age; Holsteins or Brown Swiss heifers—a little older—23 to 28 months at calving to be most efficient."

—West Virginia University

Corn For The Combine?

Shelling corn in the field as you pick it wastes fewer bushels.

Condensed from Crops and Soils

W. J. Mumm, Director of Research, Crow's Hybrid Corn Company

AMONG the major changes taking place in crop production is the present trend toward shelling corn in the field.

This trend will continue as rapidly as equipment can be built to do the job. Picker-shellers and combines modified to harvest corn have been highly successful. From my observations this equipment wastes less corn than ear-corn harvesters. This is due partly to early harvesting now possible with moist-corn storage and crop drying methods.

Breeding projects are now being conducted to modify the corn plant so it can be harvested with a combine in the same fashion as wheat or soybeans are harvested.

The ideal corn plant for combining would be much shorter than present varieties, and it would set many small ears up and down the stalk. The shredded stalks and cobs would be left on the field with combining to supply organic matter to succeeding crops.

With this goal in mind, breeders are crossing a modern, single-eared corn with teosinte, an ancient plant that grows wild in Central America. A near relative of corn, teosinte pollen when applied to corn silks gives perfect pollination. Seed from these crosses cannot be distinguished from normal corn seeds.

Corn, as we know it today, has been fashioned by selection until it has become a single-eared plant with few or no tillers. Naturally, as long as the crop was harvested by hand, the single ear was an advantage. It was easy to grasp and it filled the wagon faster than a number of small ears. As a wild plant, corn no doubt had many tillers, each carrying small ears.

Likewise, teosinte is a grass-like plant that tillers a great deal and has seed heads scattered up and down the stalks. More than 4,000 seeds can be produced by a single plant so it is very prolific. The seed is high in protein and the

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protein quality is superior to that found in corn.

Plants from crosses between teosinte and corn have many tillers and set many small ears at many nodes. Further backcrossing to corn increases ear size and reduces the number of tillers.

Because the parents are so widely different, the offspring cover a wide range of plant types. The desired type has been developed. In a short time the inbred strains that produce this type consistently should be found. It appears there will be a demand for two types of the new corn, however, one with normal height for silage and another, a shorter plant for combining.

The smaller ears produced by the corn-teosinte cross, dry faster than large ears. Scattered up and down the stalk, they give the stalk more balance than a single heavy ear would and thus will reduce the hazard of lodging. In unfavorable years that tend to produce barrenness, there is more of a chance for some ear to set in multiple-eared varieties. Teosinte makes the stalk harder and increases resistance to drouth, heat and leaf blight.

This new hybrid, from the corn-teosinte cross, should convert a higher proportion of plant food into grain. This would be a natural result of decreasing stalk development and inducing more ears. In the near future, this hybrid may make it possible to harvest corn in the same convenient way that small grains are now handled.

Use Fertilizer To Beat Drouth

Most exciting fact to come out of recent drouths, says G. E. Smith of University of Missouri, was that fertilizers actually saved corn crops for many farmers. Corn with 200 lbs. of nitrogen yielded 70 bushels on 5,600 gallons of water per bushel; corn with no nitrogen added made 19 bushels and used 21,000 gallons per bushel.

Ample moisture and ample fertility are needed. Moisture lets microbes release fertility from organic matter. Fertilizer also feeds the plant. In a drouth and with no fertilizer, lack of moisture drugs the microbes, no plant food is released, roots starve and remain shallow. With fertilizer, microbes remain sound asleep but nitrogen and phosphorus from fertilizer feed the plant. Strong roots are thus able to tap the subsoil. —*Gish Agricultural Service*

Fertilizer Necessary For Efficient Crop Production

A planned fertility program is an important factor in the budgeted operation . . .

Condensed from Agricultural Banker

Dr. M. S. Williams,
National Plant Food Institute

FERTILIZER use has played a key role in the technical revolution in agriculture. It seems reasonable that at least 25 percent of the total crop production in 1959 was due to the use of commercial fertilizer. Without fertilizer we would be worried about a shortage, rather than an abundance, of food and fiber. With the press for increased efficiency in agricultural production, fertilizer has become a necessity for the modern farmer.

Changes In Fertilizer Use

The consumption of plant nutrients supplied by commercial fertilizer has doubled in the past ten years. In 1947, farmers used about 3.4 million tons of primary plant nutrients (nitrogen, phosphate, and potash). By the end of 1958, farmers were using 6.5 millions tons of these nutrients.

During this period, the pounds of plant food contained in a bag of commercial fertilizer increased by 45 percent. The index of prices paid for fertilizer has increased less than for any other major production item that farmers buy. According to USDA, "Fertilizer is a better buy today than it was in 1940."

Changes In Production

Advances made in the science of plant nutrition are the foundation of the commercial fertilizer industry. In its beginning, the domestic fertilizer industry was based mostly on materials of organic orgin, largely waste materials and byproducts of other industries. Today, it is an important segment of the heavy chemical industry.

The technological changes affecting the production of fertilizers have paralleled those in agriculture. The newer equip-

Reprinted by permission from Agricultural Banker, 919 North Michigan Avenue, Chicago 11, Ill.

ment and methods have required increased investments. These changes have resulted in fertilizer of better quality, higher concentration and improved physical properties at lower cost per unit of plant food.

Economic Benefits From Fertilizer

Fertilizer is indispensable in the maintenance of soil fertility. In many parts of the country, the profitable production of crops is not possible without an improvement in the low fertility status of the soils. In most cases, the use of commercial fertilizer is the most economical way to provide the necessary nutrients for efficient crop production. Some of the areas where soils were inherently fertile have found that fertilizer is giving profitable increases. As these soils continue to be farmed, fertilizer will become more and more important.

Basically, fertilizer pays because it increases the amount of crops that can be produced with a given amount of other production items, such as land, labor, and machinery. This results in a reduction in cost of production per unit of crop. For the individual farmer, fertilizer usually provides the quickest means of reducing per unit costs. It also has the advantage of giving a quick return on the investment.

A few examples can be used to illustrate how proper fertilization can reduce per unit costs. In Washington, an investment of about $15 in fertilizer reduced the costs of producing a bushel of wheat from $1.53 to $1.00. For cotton in South Carolina, an added investment of about $13 per acre in fertilizer reduced costs from 28c to 22c per pound. The same story is true for corn in Ohio — adding about $10 for more fertilizer reduced costs per bushel from 84c to 80c. Forage crops respond similarly, as shown by tests with alfalfa hay in Pennsylvania. The addition of needed lime and fertilizer costing about $11 reduced costs per ton from about $34 to $19.

This year's larger meat output is a direct result, in turn, of the larger feed supply. We've been producing more feed grains than we've been using since 1952.

The reduction in costs of course means an increase in profit per unit or per acre. Modern farming, with high fixed costs, makes the use of fertilizer more of an economic necessity than ever.

Need For Credit

Many farmers purchase their fertilizer on credit. In some cases, credit is extended by their local dealers. In other cases, they bor-

row from commercial banks or one of the credit institutions. It is likely that farmers will continue to employ credit to purchase fertilizer along with other production items.

When the farmer uses fertilizer properly and combines its use with other good production practices, fertilizer is a sound investment. Many credit agency leaders are finding it pays off to require a crop production plan as a basis for production loans. The farmer can use soil test recommendations of his local fertilizer salesman or dealer, local agricultural authorities, and his own experience to determine the amount of fertilizer that will give him the greatest returns. The use of less than the amount needed reduces the soundness of the investment.

Some excellent research is being carried out to assess the risks from weather and other natural causes. Generally, results indicate these risks are exaggerated by the average farmer. However, the use of weather data can help reduce the risks in areas usually considered "high risk" areas.

A Look At The Future

The best estimates available indicate that farmers will continue to increase the amount of commercial fertilizer used. It is anticipated that fertilizer will continue to be "a good buy," especially compared with other production items such as labor.

Undoubtedly, the need for the proper use of credit to purchase fertilizer will continue to increase. More and more farmers will depend on their banker for advice on production problems, as well as credit problems. Closer working relationships between the banking industry interested in agricultural credit, the fertilizer industry, and the farmer should be mutually advantageous.

"Cow Sitters" Give Farmers New Vacations

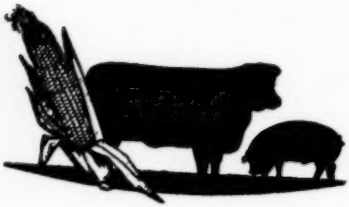
Most dairy farmers complain that chores tie them down 365 days a year.

Now, organized "cow sitting" may end this complaint. An Ohio artificial breeding technician does relief milking for $1.25 per hour plus seven cents per mile he must travel to reach the farm. He's looking for help in filling his orders which sometimes come in six months in advance.

An organization of cow sitters recently popped up in Barry county, Michigan. Details are still being worked out there.

—Better Farming Methods

Three Good Reasons For Feeding High Moisture Corn



Economical gains, high palatibility, and less roughage produce beef for $18.75 per hundredweight . . .

Condensed from Prairie Farmer

Lee Wilcox

HIGH-MOISTURE ground ear corn is a staple in the cattle-feeding program of Harry J. Fiste of Zearing, Illinois.

He stores it in a 50x12 concrete-stave silo, and feeds it with protein supplement and hay after his corn silage has been used up and before he starts the 60 to 90-day full feed of dry shelled corn.

This was the third year Fiste has ensiled wet ground ear corn. He says he has three main reasons for feeding it to the 100 calves he usually fattens in a year:

(1) He gets economical gains. His records show he is producing beef for $18.75 a hundredweight. (2) Its roughage value means feeding less hay than is needed with other forms of corn he's fed. (Usually ground ear corn contains by weight about 80-percent corn and 20-percent cobs.) (3) He believes its palatability encourages fast gains.

Seal Immediately

Fiste emphasizes the importance of sealing immediately after filling the silo with wet ground ear corn. He slopes the top of the meal down from the center, then covers it with plastic film. He tucks the film down around the sides at least six inches.

Finally, he lays a length of fire hose around the edge and fills it with water to hold the plastic down. He says freezing and thawing don't disturb the seal.

Once you remove the plastic and start feeding, he says, you must take off about four inches every day to prevent spoilage. He uses a silo unloader, and believes this is advisable with the uniform and solidly packed meal.

Fiste says he's using the same equipment to harvest wet ground ear corn that he used to pick and crib dry ear corn. However, when he sets up the field chopper at the silo, he adds a hopper, a

Reprinted by permission from Prairie Farmer, 1230 Washington Boulevard, Chicago 7, Illinois

smaller screen, and an extra pulley to speed up the blower. He uses standard chopper knives.

Last year Fiste weighed in his cattle at 545 pounds, then weighed them again 60 days later. The average daily gain was 2.76 pounds. He says this is about a half pound more than he used to get when feeding corn silage with dry ground ear corn.

Purdue University, in 1956, reported an experiment comparing the feed value per unit of dry matter of high-moisture ground ear corn (32-percent moisture) from an airtight silo with regular ground ear corn (17.7-percent moisture).

In this experiment, two lots of two-year-old Hereford steers were fed free-choice minerals and 3.7 pounds daily of Purdue supplement A.

All They Could Handle

One lot received twice a day all the wet ground ear corn the steers would clean up. The other lot was given a full feed of dry ground ear corn. No hay or other roughage was fed.

There was a definite saving in feed and feed cost in favor of the wet ground ear corn. Cattle on it required from 12 to 15 percent less corn for each pound of gain. And the feed cost per pound of gain was three cents less.

In other work at Purdue, heifer calves on the wet ground ear corn required 10 percent less corn per pound of gain than heifer calves on dry ground ear corn, and feed cost per pound of gain was one cent less.

Experiment At Illinois

Animal scientists at the University of Illinois now are conducting an experiment with Hereford heifer calves to compare the feed value of high-moisture ground ear corn in concrete-stave silos with both high-moisture shelled corn in concrete-stave silos and dry ground shelled corn.

They expect to be able to report their findings next June.

Because the wet ground ear corn is very palatable, Fiste says, he begins blending it in gradually, in an auger wagon, as the corn silage gets low.

This helps prevent his cattle from overeating the meal, with resulting scours and foundering.

He also gradually blends the wet ground ear corn with shelled corn when he makes the transition to the finishing full feed of shelled corn. During the entire feeding period he feeds two

Rotation grazed pastures usually yield nearly three times more milk production per acre than pastures grazed continually throughout the season.

pounds a day of 32-percent protein supplement and hay free choice.

Fiste thinks he'll take another step in the direction of a higher roughage ration. He plans to cut a month off the shelled-corn finish, making it 30 to 60 days.

Fiste figures his stave silo gives him low cost storage. University tests back him up. Illinois researchers say total per bushel investment in the stave silo storage runs around 70 cents a bushel in the 18x35 foot silos.

Sealed storage units run higher in initial costs. They will vary from 75 cents a bushel to a little over a dollar in the initial investment. However, these sealed units usually offer more automation in that initial cost along with a greater degree of safety to the stored product. They are also the most flexible units. You normally can start or stop feeding and add more grain without the spoilage hazard.

Another point about high moisture corn. Harvest-time field losses can be cut drastically over harvesting corn at normal moistures. Shelling loss is much lower and you catch the crop before lodging has had much chance to make a dent in yields.

Anhydrous Ammonia Equipment Safety

C. L. Hill, Purdue engineer, suggests these safety precautions to farmers who plan to side-dress their corn with anhydrous ammonia this year:

Check thoroughly the metering device, automatic gauge and valve packing on the high pressure equipment. If replacement parts are needed, contact a representative of the equipment dealer or manufacturer. Only fittings, valves and gauges manufactured for ammonia are recommended.

Replace with fittings made of heavy steel, not of brass or bronze which might develop internal cracks invisible to the eye. Strain on damaged fittings can cause equipment failure and could seriously injure the operator by allowing the release of liquid ammonia. For the same reason, don't use propane tanks for ammonia without replacing the fittings.

Other good rules to follow are always keep the liquid in the applicator tank and never leave the valves open during the off-season.

—Farm News from Purdue

A Kansan Tries Wheel-Track Planting

"You need two 3-plow tractors to keep ahead of one 2-row planter," he says . . .

Condensed from Kansas Farmer

Dick Mann

WHEEL-TRACK planting on row crops has become a standard practice on the Clee Ralston farm, Butler county, Kansas.

Success has been achieved with wheel-track planting on both sorghums and corn, altho results have not always been on the plus side. Back in 1956, Mr. Ralston experimented with 3 acres of corn. He says: "It was a dry year and yield of the wheel-track-planted corn was somewhat less than listed corn."

In 1957, he used the wheel-track method on Atlas. He disked the field 3 weeks ahead of plowing. Plowing (late in May) was 8 inches deep. Atlas was planted the same day with a lister equipped with press wheels behind.

"You must list shallow," says Mr. Ralston. "I just barely open a furrow and drop the seed. If you list deep, loose soil may wash down over seed if it rains immediately. By plowing 8 inches deep, rain will soak into the ground rather than stand in shallow furrows."

His Atlas in 1957 made 18 tons to the acre with 5 inches of irrigation water applied just before it headed out. "There was enough natural moisture previous to that time," Mr. Ralston recalls.

After Atlas was planted he used a disk harrow when plants were about 10 inches high. He couldn't get in earlier because of rain. Ordinarily, he would have used a drag harrow when plants were about 4 inches high, then a disk harrow on the second time over. A shovel cultivator was used once, which is one less cultivation

Reprinted by permission from Kansas Farmer, 8th and Jackson Streets, Topeka, Kansas

than under the old method.

Main reason for using the shovel cultivator is to get some soil shoved in around the plant to help keep it from lodging.

Why disk 3 weeks before plowing? "Because," says Mr. Ralston, "disking ahead of plowing gets the first crop of weeds started and puts the soil in a more pulverized condition for plowing. Then when you do plow and plant the same day the first crop of weeds is taken care of and large clods are not so likely to be turned up.

Usually no new equipment is required to follow the Ralston wheel-track planting program. He uses a Super C tractor to plant.

The disk harrow used is a 12-foot with which 4 rows can be taken at a time. It is pulled by a 2-plow tractor, which is light enough to cut soil compaction to a minimum. Compaction is reduced further by taking 4 rows with only one trip across the field.

For 1959, Mr. Ralston used wheel-track planting for silage corn. Corn was planted the same day field was plowed (April 28). It was harvested in August to utilize help of his son before school started and so he could start some early feeder cattle. As soon as silage was harvested he also seeded the field back to a fall pasture crop. Double-cropping can be achieved where irrigation is used.

In one experiment in 1958 on milo. Mr. Ralston plowed with a harrow attached behind. The same day he went back into the field and drilled milo in 24-inch rows and never did any cultivation. His milo made 59 bushels an acre without irrigation.

If you want to try the wheel-track planting method and have much acreage of either corn or sorghum, here is one suggestion from Mr. Ralston:

"You need two 3-plow tractors to keep ahead of one 2-row planter. The ideal would be pulling five 16-inch plows with a 2-row planter trailing."

Plow Corn Shallow

The fate of a corn crop is determined largely by the treatment it receives during the first three weeks of its life, according to Louisiana State University agronomy specialists. Cultivate early to control weeds, but keep the plow shallow. Corn roots grow out about 10 inches from the plant, then turn down. Near the plant they are about three inches below the surface. Tests show that the pruning of these roots costs about 10 bushels of corn per acre.

Plant Food Your Corn Absorbs

Do you know how much fertility is used during a 4-month growing season? . . .

Condensed from American Potash Institute Bulletin

C. M. Linsley, Soil Fertility and Testing, University of Illinois

THE corn plant produces almost half of its total weight during one month of the growing season.

This is one of the interesting facts found in a recent research project. In this experiment, researchers measured not only the amount of growth produced, but the amount of plant food absorbed during different periods.

The yield of corn in this experiment was approximately 100 bushels, and the total weight of dry matter (above ground) was 12,884 pounds. Weights of the various parts of the plant at maturity were as follows:

Leaves	1,531 lbs.
Stems	3,462 lbs.
Husks	1,179 lbs.
Cobs	989 lbs.
Grain	5,723 lbs.
Total	12,884 lbs.

The weight of the roots was not determined in this experiment. However, corn root studies made by Fahrenbacher and Snider at the Illinois Experiment Station indicated the root growth for a 100-bushel crop of corn would amount to about 5,350 pounds.

In an Ohio experiment, the 100-bushel crop of corn used 144 pounds of nitrogen, 30 pounds of phosphorus, and 98 pounds of potassium. The amount of potassium in the corn plant actually reached 113 pounds. This high point was reached in August. After about August 25, the amount gradually decreased because of loss of potassium from the plant.

The chart following shows the pounds of nitrogen, phosphorus, and potassium absorbed and the growth produced each month during the four-month growing period.

During the first month after planting, the corn crop took up only 2 per cent of the total nitrogen absorbed during the entire growing season. Two per cent of the 143 pounds of total nitrogen

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In Pounds	May 20 To June 20	June 20 To July 20	July 20 To Aug. 19	Aug. 19 To Sept. 18	Totals
Nitrogen	3	55	68	17	143
Phosphorus	1	18	32	18	69
Potassium	4	78	36	0	118
Weight	129	2,962	5,926	3,865	12,884

CALCULATED FROM OHIO STATE DATA

would amount to only about three pounds. By July 1, the corn plant had taken up 15 pounds of nitrogen per acre. The corn crop therefore does not have to have a large amount of nitrogen available during the first month to six weeks after planting.

During the third month, however, —from July 20 to August 19—the plants took up about 68 pounds of nitrogen, or almost half of the total requirement. The greatest intake of nitrogen occurred during the last few days of July when the plants took up an average of four pounds per acre per day. This heavy requirement occurred about tasseling and silking time.

The plants absorbed only 1 per cent of phosphorus during the first month, but during the third month—from July 20 to August 19—they took up almost half of their total requirement for phosphorus.

It is interesting to note that corn plants take up potassium much earlier than they do nitrogen or phosphorus. In the Ohio tests, they took up 66 per cent of their potassium requirement during the second month. The maximum rate of potassium intake occurred during the second month, when an average of 3.2 pounds per acres per day entered the plant. The potassium reached its maximum about three weeks after silking. After that time there was an actual loss, largely from the leaves and stems. Potassium may be partly washed from the leaves and stems back into the soil, or it may move back into the soil through the root system.

Results of this study show that, if high yields are to be produced, the soil has to be able to supply large amounts of plant food to the corn crop during the period of rapid growth. This has always been the goal of the Illinois Soil Program, and here is where the soil test comes in.

Skill is one commodity always in demand.

The soil tests will tell whether limestone, phosphate, and potash are needed and how much of each is needed per acre to sup-

ply the crop with plenty of plant food during the period of most rapid growth.

Testing to find out whether your soil can supply your corn crop with plenty of nitrogen when it needs it is neither so simple nor so satisfactory as testing for other elements. But previous cropping and soil treatment practices can be used as a guide in estimating nitrogen needs.

Lime Plus Fertilizer Boosts Corn Yield

"Fertilizer and lime compliment each other in the soil and neither alone is as effective in crop production as the two in proper combination," says G. R. Epperson, associate agronomist of the Virginia Polytechnic Institute.

Lime improves fertility efficiency in the soil by making phosphate more readily available. It increases the availability of molybdenum, and the activity of soil bacteria which aid nitrogen fixation and help decompose organic matter. In addition, it counteracts acidity, reducing the solubility of substances which may be toxic to plants, as well as furnishing calcium and magnesium needed by plants and microorganisms.

In a recent experiment on the effect of lime-use and soil pH on corn production, it was found that unlimed soil with pH 4.6 seriously restricted root development. As a result stalk, leaf and ear development was also poor, even where the equivalent of 1,000 lbs. of a 10-10-10 fertilizer was used. Yields obtained in this test were approximately 35 bushels of corn per acre.

Using the same fertilizer and rate of application, yields of approximately 100 bushels of corn per acre were obtained where the soil was limed to produce a pH of 6.0 or above. Thus, for the addition of 3.5 tons of ground limestone per acre, corn yields were increased by about 65 bushels per acre.

At $6 per ton for the limestone spread on the soil and only $1 per bushel for the corn produced, a gross return of $44 per acre could have been realized in this situation. Crops that would follow on this soil would also yield better, giving a greater return from the use of lime.

—Virginia Polytechnic Institute Agricultural Newsletter

Corn Insect Control Program Suggested

A 10-point corn insect control program has been suggested by W. C. Nettles, leader, Clemson Extension Entomology and Plant Disease Work.

Mr. Nettles points out that insects still destroy a considerable portion of the corn crop and that much of this loss can be prevented. He explains that some insects cause widespread losses, others cause losses in more limited areas, and that losses from still others are confined to particular fields.

The following 10 points are included in a suggested control program:

1. Plant adapted, recommended varieties. This will reduce weevil damage to ears in field and storage.

2. Increased fertilizer, soil fertility, and thick spacing help reduce damage from several corn insects.

3. Treat seed with DDT to prevent weevil damage to seed and to get better stands. (Adding a fungicide in the treatment also improves stands and vigor of seedlings.)

4. Turn land so that all stalks are buried. This will prevent emergence of larger cornstalk borer from overwintering quarters.

5. Rotate fields to reduce billbug infestations. Use substitute crops and make use of the 200-foot grain barrier.

6. Use insecticide-seed treatments or insecticide-fertilizer mixtures to control sand wireworm and at times other insects.

7. To control chinch bugs, do not plant corn near fields of small grain, especially barley, wheat, or oats. Growers with heavy losses last season, note well.

8. Turn land growing cover crops at least a month before planting corn to control seed maggots and rootworms.

9. Plant at the right time. To plant too late invites damage from lesser cornstalk borer, fall armyworm, and corn earworm.

10. Watch out for cutworms and apply insecticides as needed.

—*Clemson Agricultural College*

Corn Planting Tips

Here's how to get a good stand this spring . . .

Condensed from Wisconsin Agriculturist

HOW would you like to harvest an extra 1,000 bushels of corn from each 40 acres you raise this year? Jim Morrow, Purdue University agronomist, says it can be done. The method —get a good stand of young corn this spring.

If the hills are crowded, barren stalks and small ears result. If hills are missed, or you use too little seed, time and land are wasted. Here are 10 points that will help you avoid these problems and get a maximum stand of young corn:

1. When you prepare the seedbed, work the land just enough to get the soil in a medium cloddy condition. Soil that's worked too fine may develop a hard crust after a heavy rain. This makes it difficult for corn seedlings to emerge.

Wheel track planting favors rapid germination and emergence. This method keeps the soil loose an inch or so away from the row and gives roots plenty of air.

2. Your corn planter should be well oiled before the planting season starts. Fill the oil holes in a new planter with kerosene to cut the paint. Then add a good grade of machine oil on all friction parts except those enclosed in housings inside the gear case. Fill the gear case to the level of the oil plug with clean new oil.

With older planters, remove the drain plug from the bottom of the gear case. Then drain the old oil and flush out with kerosene. Next refill the housing with clean oil.

3. Select planter plates that are suitable for the size and shape of the kernels.

Seed grades are standardized in Wisconsin. These are small, medium and large grades of both flats and rounds. You'll find a wide variety of planter plates available for most grades.

4. Apply a suitable starter fertilizer containing nitrogen at planting time. For check rowed corn use 100 to 150 pounds per acre near the hill. For drilled or hill dropped corn apply 150 to 250 pounds spread along the row.

Reprinted by permission from Wisconsin Agriculturist, Racine, Wisconsin

When high analysis fertilizers are used you can cut down the rate accordingly.

To avoid injury to germination don't let the fertilizer come in contact with the seed. Place it at least 2 inches to the side and deeper.

5. Don't plant corn until conditions are favorable for germination—when the daily mean temperature is 60 to 65 degrees.

If possible plant corn by May 20 and not later than June 1. If planting is delayed, select earlier maturing varieties.

6. How thick to plant depends on: available fertility and moisture, and proper weed and insect control.

Plant density may range from 13,000 to 17,000 plants per acre, depending on the local situation. On most Wisconsin farms, populations less than 17,000 plants per acre are best.

7. Planting depth should vary with soil type, moisture and temperature.

In heavier soils with adequate moisture, 1½ inches is deep enough. In light sandy soils and others lacking moisture near the surface, plant 2 or 3 inches deep.

8. Avoid fast driving which causes uneven stands.

As driving speed increases, so does the chance of uneven planting and space. Fast driving can cause misses, or bunching of many plants to the area.

9. Don't be careless with the cultivator or weed killing chemicals. Corn is a shallow rooted plant, and cultivating too deep or too close can damage roots.

Weed killers such at 2,4-D if used with extreme caution can be used to control broad leaved weeds in corn.

But if improperly applied, the chemical can seriously damage corn.

10. Insects may cause serious losses in corn production. You can protect germinating seed from seed corn maggots, seed corn beetles and light wireworm infestations by using a seed protectant such as dieldrin. For heavy wireworm infestations, treat the soil with aldrin, heptachlor or chlordane.

TGE is a highly contagious virus disease that often sweeps through exposed swine within a few days after it is introduced. The symptoms are scours and vomiting.

The disease spreads from farm to farm when infected hogs are moved into healthy herds. Visitors, dogs, birds and other carriers can also spread TGE infection. —*The American Hampshire Herdsman*

ONE YEAR CONTINUING INDEX

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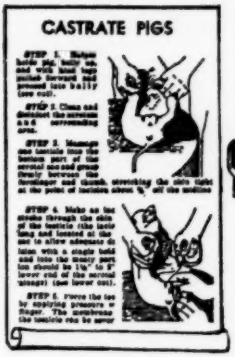

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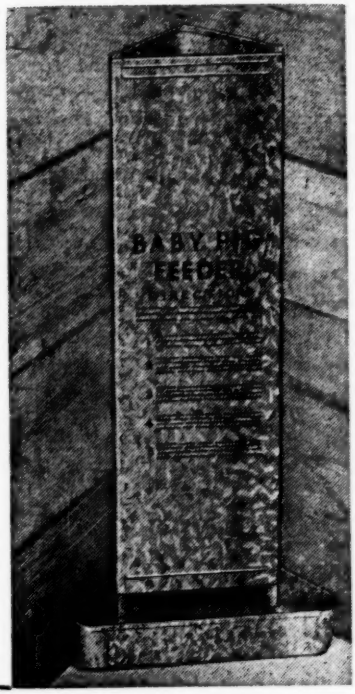

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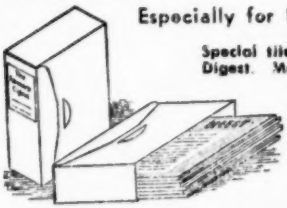

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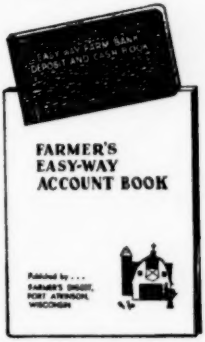

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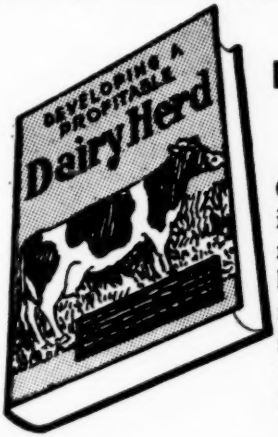

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